United States Air Force

Environmental Restoration Program

FINAL

FIVE-YEAR REVIEW REPORT

Homestead Air Force Base, Florida

May 2003

HOMESTEAD AIR FORCE BASE

FIVE-YEAR REVIEW REPORT

DRAFT FINAL

Prepared by:
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May 2003

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Date:

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LIST OF ACRONYMS

ACC	Air Combat Command
AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFCEE	Air Force Center for Environmental Excellence
AFRC	Air Force Reserve Command
AFRPA	Air Force Real Property Agency
AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
ARS	Air Reserve Station
ARB	Air Reserve Base
AST	above ground storage tank
bcy	bank cubic yards
bgs	below ground surface
bls	below land surface
BNA	base/neutral and acid extractable
BRA	baseline risk assessment
BRAC	Base Realignment and Closure
BCT	BRAC Cleanup Team
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAH	chlorinated aliphatic hydrocarbons
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminants of concern
CTL	cleanup target level (FDEP)
cy	cubic yard
DCE	dichloroethene
DERM	Miami-Dade County Department of Environmental Resources Management
DNAPL	dense nonaqueous-phase liquid
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
FAC	Florida Administrative Code
FFA	Federal Facilities Agreement
FOST	Finding of Suitability to Transfer
FS	feasibility study
ft	foot
GCTL	groundwater cleanup target level (FDEP)
gpm	gallon per minute
HAFB	Homestead Air Force Base
HRS	hazard ranking system
HSWA	hazardous and solid waste amendments
IRA	interim remedial action
IRP	Installation Restoration Program
LF	Landfill
LNAPL	light nonaqueous-phase liquid
MCL	maximum contaminant level
MOA	memorandum of agreement
MSL	mean sea level
NAPL	nonaqueous-phase liquid
NCP	National Contingency Plan
NFRAP	no further remedial action planned

NPL	National Priorities List
OTU	operable training unit
OU	Operable Unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PA/SI	preliminary assessment/site inspection
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
ppb	parts per billion
PSC	possible source of contamination
PQL	practical quantification limit
RAB	Restoration Advisory Board
RAO	remedial action objective
RBC	risk based concentration
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RFI	RCRA Facility Investigation
RG	remedial goal
RI	remedial investigation
RI/BRA	remedial investigation/baseline risk assessment
ROD	record of decision
SAC	Strategic Air Command
SCTL	soil cleanup target level (FDEP)
SERA	screening ecological risk assessment
SVOC	semivolatile organic compound
SWMU	solid waste management units
TAC	Tactical Air Command
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TFW	Tactical Fighter Wing
TPH	total petroleum hydrocarbon
TRPH	total recoverable petroleum hydrocarbons
TTW	Tactical Training Wing
UCL	upper confidence limit
µg	microgram
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VCA	voluntary custodial action
VOC	volatile organic compound

EXECUTIVE SUMMARY

Introduction

At Homestead Air Force Base (AFB), certain site-specific or zone-wide (operable unit) remedial actions are being performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In 1994, Homestead AFB was transitioned from an active duty base to an Air Reserve Station (ARS) under Air Force Reserve Command (AFRC). Homestead AFB encompassed 2,938 acres. As a result of realignment, approximately one-third of this property has been retained for military use by AFRC. This retained property, referred to as the cantonment area, comprises Homestead ARS. The Air Force Real Property Agency (AFRPA) is transitioning the remaining property, outside the cantonment area, to civilian use. It is those sites managed by the AFRPA that make up this Five-Year Review. Sites located within the AFRC cantonment area will be addressed in a separate document and submitted by AFRC.

Organization

This Five-Year review for 2002 constitutes the first required review/reporting cycle for Homestead AFB. A summary of the AFRPA sites and operable units (OUs) covered in this report is as follows:

- OU 6 Aircraft Washrack Area (Site SS-3, former Site SP-7)
- OU 9 Boundary Canal System
- OU 10 Landfill (Site LF-12, former LF-1)
- OU 11 Wastewater Treatment Plant, Incinerator Ash Disposal Area, and Outfall Canal (Site LF-19 & WP-23, former D-1 & D-2)
- OU 14 Drum Storage Area (Site SS-26)
- OU 16 Hawk Missile Site/Drum Storage
- OU 17 C-130 Hangar Fuel Release
- OU 18 Contractor Storage Area/Construction Debris Landfill
- OU 20/21 Outdoor Staging Area (Adjacent to Buildings 618 & 619)/Base Supply Hazardous Materials Storage Facility (Building 619)
- OU 22 Former Building 761 Acrospace Ground Equipment Maintenance Facility and Former Building 764 Aerospace Ground Equipment Maintenance (former area of concern [AOC] Units 12 & 15)
- OU 26 Aircraft Fabrication Shop
- OU 28 Propulsion Maintenance Facility
- OU 29 Avionics/Aircraft Ground Equipment Maintenance Facility
- OU 30 Contractor Storage Area, Former Building 767
- OU 31 Non-destructive Inspection Lab, Building 755

Conclusions and Recommendations

The operable unit Records of Decision (RODs) identified remedial action objectives (RAOs) which defined the scope and purpose of the cleanup action required to address the potential threats to human health and the environment. After the remedial action has been implemented, the RAOs continue to serve as a metric against which the monitoring and performance data are measured.

Overall, the remedial actions and remedial systems at Homestead AFB are successfully meeting the operable unit RAOs and are achieving their principal performance goals of removing contamination from the source areas.

Where cleanup goals are presented in the RODs, the applicable or relevant and appropriate requirements (ARARs) identified remain current. Additionally, no new state or federal laws have been enacted which may call into question the selection and protectiveness of the implemented remedies.

The Air Force affirms (certifies) that the remedies for the sites addressed in this report remain protective of human health and the environment. The remedies also comply with ARARs and are reasonably cost-effective. Those remedies that rely on some form of treatment are reducing the toxicity, mobility, and/or volume of hazardous substances at those sites. It is expected that the remedial activities and Land Use Controls/Institutional Controls (LUC/IC) at Homestead AFB will permanently reduce the risks to human health and environment by eliminating, reducing, or controlling exposures to human and environmental receptors through engineering and institutional controls. Furthermore, there are no known areas of noncompliance.

General recommendations for Homestead AFB include:

- The remedial actions should continue to be implemented in accordance with the United States Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) approved plans governing system operation, maintenance, and long-term monitoring.
- Evaluations of system operation and environmental monitoring should continue and be used as a means of identifying opportunities to both optimize the operation of the system (either to accelerate contaminant removal or improve cost-effectiveness) and refine long-term monitoring activities.
- Future evaluations of the remedial systems and long-term monitoring should attempt to identify the level of progress toward meeting site- or zone-specific cleanup goals developed during the remedy decision-making process.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: **Homestead Air Force Base**		
EPA ID *(from WasteLAN)*: **FL7570024037**		
Region: IV	**State: Florida**	**City/County: Miami-Dade County**

SITE STATUS	
NPL status: X Final Deleted Other (specify)	
Remediation status (choose all that apply): X Under Construction X Operating X Complete	
Multiple OUs?* X YES NO	**Construction completion date:** 12/16/1996
Has site been put into reuse? X YES NO	

REVIEW STATUS	
Lead agency: EPA State Tribe X Other Federal Agency U.S. Air Force	
Author name: Gregory E. Keefe	
Author title: Field Engineer	**Author affiliation:** AFCEE/ERB
Review period:** 1 / 1 / 2002 to 10 / 31 / 2002	
Date(s) of site inspection: January – October 2002	
Type of review: X Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion	
Review number: X 1 (first) 2 (second) 3 (third) Other (specify) _____	
Triggering action: X Actual RA Onsite Construction at OU # 6 Construction Completion Other (specify)	Actual RA Start at OU#____ Previous Five-Year Review Report
Triggering action date *(from WasteLAN)*: 01 / 12 / 1996	
Due date *(five years after triggering action date)*: 01 / 12 / 2001	

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

None.

Recommendations and Follow-up Actions:

Recommend that OUs 6, 10, 14, 16, and 17 not be subject to another five-year review, as there are no further required actions at these sites.

Recommend that once the ROD is signed for OU 9 and OU 11, the remedy of No Further Remedial Action Planned (NFRAP) for OU 9 be accepted.

Recommend that the remedy at OU 11 Outfall Canal be implemented following ROD approval.

Recommend that enhancements be made to the OU 26 natural attenuation program.

Recommend that groundwater monitoring continue at OU 18 and 26 until it is agreed that monitoring is no longer necessary.

Recommend that CERCLA program be closed for OU 22 and the site be moved to the state petroleum program.

Recommend that RODs are approved and biennial groundwater sampling begin April 2003 for OUs 20/21, 22, 30 & 31.

Protectiveness Statement(s):

Based on the completed activities, the intent and goals of the RODs for OUs 6; and the Extended Site Investigation and Preliminary Risk Evaluation for OUs 10, 14, 16, & 17 have been met and have been found to be protective of human health and the environment.

The remedies at OUs 9, 18, and 26 are expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

The intent and goals of the ROD for OU 11 will be protective of human health and the environment.

Based on the completed activities, the intent and goals of the proposed ROD have been met at OU 20/21, 22, 30 and 31 and found to be protective of human health and the environment.

Other Comments:

None.

HOMESTEAD AIR FORCE BASE
HOMESTEAD, FLORIDA
FIRST FIVE-YEAR REVIEW REPORT

1.0 INTRODUCTION

The purpose of five-year reviews is to determine whether the remedies at a site are protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and recommendations to address them.

The United States Air Force is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with the section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The United States Air Force interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Air Force (USAF) conducted the first five-year review of the remedial actions implemented at Homestead AFB in Homestead, Florida. This review was conducted from January 2002 through October 2002. The report documents the results of the review.

The triggering action for this statutory review is the initiation of a remedial action at OU 6 on January 12, 1996. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. In 1994, Homestead AFB was transitioned from an active duty base to an ARS under AFRC. Homestead AFB encompassed 2,938 acres. As a result of realignment, approximately one-third of this property has been retained for military use by AFRC. This retained property, referred to as the cantonment area, comprises Homestead ARS. The remaining property, outside the cantonment area, is being transitioned to civilian use by the AFRPA. It is those sites managed by the AFRPA that make up this five-year review.

The operable units to be discussed are as follows:

- OU 6 Aircraft Washrack Area (Site SS-3, former Site SP-7)
- OU 9 Boundary Canal System
- OU 10 Landfill (Site LF-12, former LF-1)
- OU 11 Wastewater Treatment Plant, Incinerator Ash Disposal Area, and Outfall Canal (Site LF-19 & WP-23, former D-1 & D-2)
- OU 14 Drum Storage Area (Site SS-26)
- OU 16 Hawk Missile Site/Drum Storage

- OU 17 C-130 Hangar Fuel Release
- OU 18 Contractor Storage Area/Construction Debris Landfill
- OU 20/21 Outdoor Staging Area (Adjacent to Buildings 618 & 619)/Base Supply Hazardous Materials Storage Facility (Building 619)
- OU 22 Former Building 761 Aerospace Ground Equipment Maintenance Facility and Former Building 764 Aerospace Ground Equipment Maintenance (former AOC Units 12 & 15)
- OU 26 Aircraft Fabrication Shop
- OU 28 Propulsion Maintenance Facility
- OU 29 Avionics/Aircraft Ground Equipment Maintenance Facility
- OU 30 Contractor Storage Area, Former Building 767
- OU 31 Non-destructive Inspection Lab, Building 755

As there are many operable units to be discussed in the five-year review, each will be discussed individually, to include the following:

Operable Unit Chronology
History of Contamination
Initial Response
Basis for Taking Action
Remedial Actions
Five-Year Review Process (some portions)
Technical Assessment
Issues
Recommendations and Follow up Actions
Protectiveness Statement

An introductory section will include information that is consistent for all of the sites discussed in this Five-Year Review, and thus, will not be included in the site-specific sections of this report. Additionally, those sites that received closure prior to production of this document (OUs 6, 10, 14, 16 and 17) were not subject to data review.

1.1 SITE CHRONOLOGY

Homestead Army Air Field, a predecessor of Homestead AFB, was officially activated in September 1942, when the Caribbean Wing Headquarters took over the air field previously used by Pan American Air Ferries, Inc. The airline had developed the site a few years earlier and used it primarily for pilot training. Prior to that time, the site was undeveloped. Initially, Homestead Army Air Field served as a staging facility for the Army Transport Command, which was responsible for maintaining and dispatching aircraft to overseas locations. In 1943, the field mission was changed when the 2nd Operational Training Unit (OTU) was activated to train the transport pilots and crews.

In September 1945, a severe hurricane caused extensive damage to the air field. Both, the cost of rebuilding the field and the anticipated post-war reductions in military activities led to the base being placed on an inactive status in October 1945. The base property was turned over to the Dade County Port Authority, which retained possession of it for the next eight years. The runways were used by crop dusters, and the buildings housed a few small industrial and commercial operations.

In 1953, the federal government again acquired the installation and some surrounding property and rebuilt it as a Strategic Air Command (SAC) base. The first operational squadron arrived at Homestead AFB in February 1955, and the base was formally reactivated in November of the same year. Except for a short period during 1960, when modifications were made to accommodate B-52 aircraft, the base remained an operational SAC base until 1968.

The command of Homestead AFB was changed from SAC to the Tactical Air Command (TAC) in July 1968, and the 4531st Tactical Fighter Wing (TFW) became the new host unit. F-100 Cs and Ds were flown there during this time. When the 31st TFW returned from Southeast Asia in October 1970, the 4531st TFW was deactivated and the 31st TFW became the host unit for Homestead AFB, flying F-4 D and E aircrafts. In 1981, the 31st TFW was redesignated the 31st Tactical Training Wing (TTW). In October 1984, the base was converted to the 31st TFW and was home to F-16 aircraft. The base was transferred to Headquarters Air Combat Command (ACC) on 1 June 1992.

On 24 August 1992, Hurricane Andrew struck south Florida, causing extensive damage and leaving approximately 97 percent of base facilities dysfunctional. As a result of the destruction, Homestead AFB was recommended for realignment by the Department of Defense Base Realignment and Closure (BRAC) Commission in 1993. The ACC departed the base on 31 March 1994, and one-third of the base property was transferred to AFRC, while the remaining two-thirds were transferred to the AFRPA, formerly known as the Air Force Base Conversion Agency (AFBCA). The cantonment area, retained for military use as Homestead ARS, is under the command of AFRC. Homestead ARS is hosted by the 482nd Reserve Fighter Wing and currently flies F-16 aircraft.

On 1 October 1996, responsibility for IRP sites located within the cantonment area was transferred from the AFBCA to Homestead ARS. In 2002 the AFBCA became the AFRPA and retains responsibility for managing IRP sites within the remaining two-thirds of the former installation property.

A historical listing of general industrial operations conducted at Homestead ARB is provided in Table 1.

1.2 BACKGROUND

1.2.1 Physical Characteristics

Homestead AFB is located along the flank of the Atlantic Coastal Ridge and the Southern Coastal Slope, which are subdivisions of the southern distal zone of the Atlantic Coastal Plain physiographic province. The surface topography at the base is relatively flat, with elevations ranging from 2 feet above mean sea level (ft-MSL) to 10 ft MSL.

The prevailing weather pattern at Homestead AFB is typical of subtropical climates. The average annual temperature is 74°F, with approximately 37 days reaching temperatures above 90°F. The mean annual precipitation is approximately 58 inches, with 70 percent of the rainfall occurring between May and October.

Surface soils at Homestead AFB are typically less than 6 inches thick and consist of native marl, weathered limestone bedrock, or imported fill. The uppermost lithologic unit at the base contains 15 to 20 feet of oolitic and bryozoan limestone facies of the Miami Oolite, consisting of soft, cream or tan limestone, interbedded with sandy limestone, and thin layers of hard limestone. The underlying Fort Thompson Formation contains 50 feet of alternating shallow marine, brackish marine, and freshwater limestone consisting of white and tan to gray calcareous sandstone and sandy limestone with some quartz sand. Both of the formations are highly permeable and are the principal components of the Biscayne Aquifer. Underlying the Fort Thompson Formation is the Tamiami Formation consisting of clayey, calcareous marl, silty shelly sands, and limestone, and the Hawthorn Formation consisting of green dolosilt to quartz sand.

The water table occurs at depths ranging from 0 to 5 ft below ground surface. Although the general direction of groundwater flow, within the shallow aquifer beneath Homestead AFB, is southeasterly toward Biscayne Bay, the hydraulic gradients throughout the base are very flat. As a result, local flow directions are strongly influenced by rainfall and the presence of the drainage canal along the base boundary (boundary canal). The

surficial aquifer, the Biscayne, is the sole source of potable water in Miami-Dade County, and has been declared a sole-source aquifer by the USEPA, pursuant to Section 1425 of the Safe Drinking Water Act.

1.2.2 Land and Resource Use

Homestead AFB is located in southeastern Miami-Dade County near the southern tip of peninsular Florida (Figure 1). Homestead AFB is located along U.S. Highway 1 approximately 25 miles southwest of Miami, 7 miles east of Homestead, and 2 miles west of Biscayne Bay. The former military installation covered 2,938 acres, and approximately one-third of the original base comprises the cantonment area, which has been retained for military use by AFRC as Homestead ARB. The base is bordered on the west and south by agricultural land, and to the north, east, and west by residential and agricultural lands (Figure 2).

1.2.3 History of Contamination

The IRP at Homestead AFB was initiated in 1983 with a Phase I Records Search to identify potential IRP sites and AOCs at the base. On 30 August 1990, Homestead AFB was placed on the National Priorities List (NPL), which brought it under the federal facility provisions of Section 120 of CERCLA. This action required the Air Force to enter into a Federal Facilities Agreement (FFA) with the USEPA Region IV and the FDEP.

The realignment process at the installation has not adversely affected the progression of the IRP. Environmental activities within the cantonment area are administered by the AFRC in conjunction with AFRPA's operations outside the cantonment area. There have been 18 IRP sites identified within the cantonment area currently managed by Homestead ARS, and 20 IRP sites identified outside the cantonment area which are managed by AFRPA.

IRP studies, investigations, remedial designs (RDs), and RAs have been performed at Homestead AFB. Key regulatory dates/actions for IRP activities conducted at the base are as follows:

- In August 1983, Homestead AFB initiated a Phase I Records Search to identify IRP sites and AOCs. The Phase I Records Search document, prepared by Engineering Science, identified 13 locations as having the potential for environmental contamination.

- In March 1986, a Phase II-Confirmation/Quantification IRP report was prepared by Science Applications International Corporation to quantify the extent and degree of contamination at the 13 sites.

- In September 1987, Geraghty & Miller, Inc., was retained by the U.S. Army Corps of Engineers (USACE) to conduct Phase IV IRP RIs at OUs 1 through 9. The objectives of the RI were to determine the horizontal and vertical extent of subsurface constituents at each Possible Source of Contamination (PSC), and determine the risks to public health and the environment. RIs were conducted according to CERCLA guidelines for each PSC.

- On 5 January 1990, a permit was issued to Homestead AFB under the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984. The permit listed 21 Solid Waste Management Units (SWMUs), required that RCRA Facility Investigations (RFIs) be performed at eight of the 21 SWMUs, and required further assessment of one of the 21 SWMUs. Each of the eight sites requiring RFIs have been investigated under the IRP, pursuant to Executive Order 12580, and in accordance with RCRA guidelines.

- In accordance with Section 120(d)(2) of the Superfund Amendments and Reauthorization Act (SARA) of 1986, the USEPA prepared a final Hazard Ranking System (HRS) scoring package.

As a result of the HRS score, the facility was proposed for inclusion on the NPL on 14 July 1989.

- As a result of the proposed placement on the NPL, USEPA Region IV, State of Florida, and the Air Force entered into an FFA for Homestead AFB on 25 May 1990 (see Attachment A).
- On 30 August 1990, the base installation was officially added to the NPL.
- In January 1991, the base entered into a Consent Agreement with FDEP making it subject to the requirements of Florida Administration Code (FAC) 62-770, governing discharges of petroleum products to the environment.
- On 24 August 1992, Hurricane Andrew struck south Florida, destroying 97 percent of Homestead AFB capabilities. The base was subsequently slated for realignment in 1993. This listing resulted in the IRP being subject to the requirements of the Community Environmental Response Facilitation Act, accelerating the CERCLA process. The listing also resulted in the establishment of an operating location of the AFRPA on site. The AFRPA is responsible for the cleanup and transition of base property targeted for civilian use. The AFRPA maintained complete responsibility for the IRP until late 1995, when a USAF funding policy mandated that AFRC manage the sites within the cantonment area.
- In 1993 Montgomery Watson was retained by the USACE to perform data gap completion on nine CERCLA sites within the cantonment area, and ten potential sources of contamination.
- In April 1993, a second RFI was conducted to evaluate possible releases resulting from Hurricane Andrew. Sixty-eight SWMUs were identified.
- In 1994, upon the departure of ACC from Homestead AFB, the installation was transitioned to AFRC. Homestead ARS encompasses approximately one-third of the installation's former property holdings.
- In 1994, through an AFBCA initiative, Woodward-Clyde was retained by the USACE to conduct confirmation sampling at 38 of the SWMUs identified in the 1993 RCRA Facility Assessment.
- In October 1996, administration of the IRP within the cantonment area was transferred from AFBCA to AFRC.

1.3 Five-Year Review Process

1.3.1 Administrative Components

Members of the BRAC Cleanup Team (BCT) and the Restoration Advisory Board (RAB) were notified of the initiation of the five-year review during BCT and RAB meetings held March 19, 2002. Members of the BCT were informed that inspections of the CERCLA sites were to be conducted and were invited to participate. The Homestead Air Force Base Five-Year Review team was lead by Mr. Gregory Keefe, AFCEE Field Engineer.

1.3.2 Community Involvement

The Air Force has a public participation program at Homestead AFB to promote public understanding of the cleanup process and its results, and to ensure that the community's concerns are solicited, considered, and thoroughly addressed. The backbone of this program is the Community Relations Plan, which assesses the

public's level of knowledge, interest, and information needs by conducting community interviews and researching local social, demographic, economic, and political information. The Community Relations Plan recommended compatible public involvement strategies that included a RAB, newsletters and fact sheets, an Information Repository, and public meetings at project milestones.

RABs are a joint creation of the Department of Defense and the USEPA and are a vehicle for community input during environmental restoration. A RAB was formed for Homestead AFB in October 1993 and meets routinely. Community members of the RAB exchange information and discuss restoration issues with the BCT which includes representatives from the USAF, USEPA, and the FDEP. Currently, there are seven community members on the Homestead AFB RAB.

RAB meetings provide opportunities for direct public participation. Presentation topics include current investigations, results, plans for the environmental restoration program, and current issues and decisions facing the BCT. All RAB meetings are open to the public and include a public comment period for the audience members to ask questions and express opinions and/or concerns.

Newsletters and fact sheets are developed to update community members on the current issues and environmental investigation and/or remediation activities. Newsletters are published four times a year and fact sheets are published when needed to provide more detail on specific activities and at major milestones in the environmental restoration process at Homestead AFB.

The public has access to current and historical information regarding environmental restoration activities at Homestead AFB through the Information Repository located at the library of the Miami-Dade Community College, Homestead Campus. Included in the repository are technical documents such as investigation and remedial action reports, work plans, and RAB meeting minutes and handouts.

The USAF has kept the public informed of and involved in the decision making process for the five-year review through the RAB.

1.3.3 Interviews

As all of the sites listed in this report are closed, in long term monitoring or undergoing remediation, no interviews were conducted.

2.0 OPERABLE UNIT 6

2.1 HISTORY OF CONTAMINATION

OU6 is the Aircraft Washrack Area, Site SS-3 (former Site SP-7) located in the central portion of the base, approximately 720 feet north of the former Building 720 (Figure 3). The site covers an area approximately three acres in size and has dimensions of 320 feet by 400 feet. The site is bordered on the northwest by a drainage ditch (parallel to Bikini Boulevard), on the southwest by a low grassy swale, on the northeast by a ditch, and on the southeast by asphalt flight apron. Prior to Hurricane Andrew, the site consisted of a covered, concrete and asphalt aircraft washrack structure, a utility building and Building 723. Due to damage experienced during the hurricane, the cover and frame of the washrack are no longer present. The area surrounding the washrack is covered with grass. Approximately 35 percent of the site is covered with asphalt and/or concrete.

Two aboveground storage tanks (ASTs) with capacities of 750 and 1,500 gallons were used to store waste oils, hydraulic fluids, spent solvents, and other liquid wastes from the flightline shops. The tanks were located in the western portion of the site. During storage and removal operations, frequent spills and overflows onto the ground occurred. Dumping of liquid wastes in the area were also reported. Once liquid waste disposal operations were halted, the tanks were removed for off-site disposal in 1980. Soils in the former tank area, which were reportedly discolored at the time of the tank removal, have either been removed or covered, leaving no visible evidence of waste residue.

A list of important OU 6 Aircraft Washrack Area (Site SS-3, former Site SP-7) historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
OU 6 Aircraft Washrack Operation	1970 to 1980
ASTs Removed	1980
Initial Site Investigation	1986
Additional Investigations	1987
RI/FS (FS)	1990, 1991 and 1993
ROD	1995
ROD Amendment	1997
ROD Implementation	1996
Groundwater Monitoring	1997-1998
Site Closure	1999

2.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

An IRP Phase I – Records Search was conducted in 1983 and the Aircraft Washrack was determined to have moderate to high contamination potential. Thus the site was recommended for the IRP Phase II – Confirmation/Quantification. Three shallow monitoring wells were installed on the site during this phase (1986). Floating non-aqueous phase liquid (NAPL) was found in one well. Although the extent of the contamination was not determined, this Phase II investigation indicated that contamination at the site was attributable to oil and grease and elevated total organic carbon (TOC).

In 1987, the IRP Phase IV – Additional Investigations was conducted in order to determine the lateral extent of the contamination. Based upon the results of this investigation, a RI was conducted in 1990 and 1991, with additional investigation activities conducted in 1993.

Results of these investigations revealed the following:

Soils
Contaminants detected in OU 6 soils include VOCs, BNAs, pesticides and metals. The VOCs detected (acetone and methyl ethyl keytone) are both common laboratory contaminants; the acetone is thought to be related to the decontamination process. BNAs, primarily polynuclear aromatic hydrocarbons (PAHs), were detected in shallow soils and at depths up to 6 feet bls. Dichlorodiphenyltrichloroethane (DDT) metabolites were detected in shallow soils. The metal arsenic was identified above background.

Groundwater
Groundwater contaminants consist of VOCs, primarily benzene, toluene, ethylbenzene, and xylenes (BTEX), and the BNA compounds (naphthalenes, bis[2-ethylhexyl]phthalate and fluorine). Light nonaqueous-phase liquid (LNAPL) was also detected in one monitoring well.

Based on the results of the remedial investigation/baseline risk assessment (RI/BRA), the site moved on to the FS and Proposed Plan phases of the CERCLA process.

2.3 REMEDIAL ACTIONS

2.3.1 Remedy Selection

The ROD for this OU was signed in 1995. The alternative selected was:

Alternative 4 Excavation and Off-Site Thermal Treatment, Disposal of Contaminated Soils, and Natural Attenuation and Institutional Controls of Groundwater

The alternative consists of:

- Institutional Controls to restrict the placement of potable wells in the contaminated groundwater near or down gradient of the site until such time as the protectiveness of the groundwater is reached. It is estimated that protectiveness will be reached within a 5-year period.
- Excavation of soil/rock to meet performance standards, approximately 2,100 cubic yards and replacement with an equal volume of fill material.
- Off-site thermal treatment and disposal of excavated soil.
- LNAPL recovery during soil excavation using a skimmer pump.
- Sending LNAPL to off-site disposal through energy recovery.
- Disposal of water collected during excavation at a publicly-owned treatment works which meets the required standards. If water does not meet performance standards, treatment will need to occur before disposal.
- Groundwater monitoring with five-year site review until contaminants are at levels considered protective of human health and the environment.

A ROD Amendment was signed in 1997. The amended remedy addresses revised waste volumes, revisions to the waste management approach, and revised costs associated with the above revisions.

2.3.2 Remedy Implementation

OHM Remediation Services Corporation began remedial action activities January 8, 1996 with the abandonment of four groundwater monitoring wells. Between January 12, 1996 and December 16, 1996, approximately 3,450 cubic yards of contaminated soil/limestone were excavated and removed. Approximately 4,635 tons of contaminated soil/limestone were transported off-site and disposed at a CERCLA approved, RCRA Subtitle D landfill facility.

Throughout the excavation activities, limited areas of LNAPL were primarily observed in areas of solution cavities within the soil/limestone. A total of fifteen 55-gallon drums of used LNAPL absorbent material was generated during LNAPL recovery. Approximately 30 gallons of a LNAPL/wastewater was generated during consolidation of these 15 drums. In addition, approximately 2,225 gallons of wastewater was generated during equipment decontamination activities. The used LNAPL absorbent material was transported off-site and disposed of at CERCLA approved, RCRA Subtitle C and D landfill facilities. The wastewater and LNAPL/wastewater mixture was transported off-site and disposed of at an FDEP-approved industrial wastewater treatment facility.

Nine random confirmation soil/limestone samples were collected from the finished sidewalls of the excavation in accordance with the amended RA work plan. Concentrations of detected VOCs and semivolatile organic compounds (SVOCs) were below the applicable FDEP Soil Cleanup Goals (industrial scenario) and Homestead AFB-specific standards established by the BCT. Total petroleum hydrocarbons (TPH) were not detected above the practical quantification limit (PQL) in the nine confirmation soil/limestone samples.

2.3.3 System Operations/Operation and Maintenance

OHM Remediation Services Corporation conducted semiannual groundwater monitoring in 1997 and 1998. Results from all four sampling events indicated that no analytes exceeded the standards defined by FAC Chapter 62-550 Primary Drinking Water Standards Maximum Contaminant Levels, FAC Chapter 62-770 Petroleum Contamination Cleanup Criteria, and the USEPA National Primary Drinking Water Standards. Based on these results, the Air Force recommended and received unrestricted No Further Action for the site (FDEP letter dated December 9, 1998; Miami-Dade County Department of Environmental Resources Management [DERM] letter dated March 15, 1999; and USEPA letter dated June 3, 1999).

2.4 FIVE-YEAR REVIEW PROCESS

2.4.1 Document Review

This five-year review consisted of a review of relevant documents including operations and maintenance records and monitoring data. Applicable groundwater cleanup standards were reviewed.

2.4.2 Data Review

Groundwater Monitoring

OHM Remediation Services Corporation conducted semiannual groundwater monitoring in 1997 and 1998. Results from all four sampling events indicated that no analytes exceeded the standards defined by FAC Chapter 62-550 Primary Drinking Water Standards Maximum Contaminant Levels, FAC Chapter 62-770 Petroleum Contamination Cleanup Criteria and the USEPA National Primary Drinking Water Standards. Based on these results, the Air Force recommended and received unrestricted No Further Action for the site (FDEP letter dated December 9, 1998; DERM letter dated March 15, 1999; and USEPA letter dated June 3, 1999).

2.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 6 area. Several monitoring wells were found to be on the site, and were subsequently abandoned in place in November 2002. No other unusual observations were documented during this visit.

2.5 TECHNICAL ASSESSMENT

Not applicable.

2.6 ISSUES

There are no issues at this site.

2.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

As OU 6 has received unrestricted No Further Action (FDEP letter dated December 9, 1998; DERM letter dated March 15, 1999; and USEPA letter dated June 3, 1999), there are no further required actions. Thus, OU 6 will not be subject to another five-year review.

2.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the ROD for OU 6 have been met and have been found to be protective of human health and the environment.

2.9 NEXT REVIEW

As this OU has received closure, the site will not be included in the next five-year review.

3.0 OPERABLE UNIT 9

3.1 HISTORY OF CONTAMINATION

The Boundary Canal system at Homestead AFB is shown in Figure 4. This system includes the Boundary Canal, the flightline canal, associated drainage canals, and the stormwater reservoir. The Boundary Canal is approximately 8 miles in length. A control structure (pumphouse) separates the stormwater reservoir from the Outfall Canal (OU 11). The Boundary Canal is composed of two major segments, the West-South segment and the North-East segment. A dike is present along the outside bank of the Boundary Canal to minimize off-base runoff from entering the canal. The segments of the Boundary Canal lead to the reservoir at the southeast corner of the base.

West-South Boundary Canal Segment

The West-South Boundary Canal segment begins in the northwestern corner of the base at Biscayne Drive (S.W. 288th Street). It flows south and then turns west at the Ordnance Storage Area past Phantom Lake. The segment flows along the west and south perimeters of the base and leads to the Stormwater Reservoir at its western edge. The total length of the West-South Boundary Canal segment is approximately 25,800 feet (4.9 miles).

The width of the West-South Boundary Canal varies from less than 10 feet wide near its origin at Biscayne Drive and generally widens downstream to over 40 feet. Total depth of the West-South Boundary Canal segment ranges from 4 to 6 feet, while water depth ranges from 2 to 5 feet with the greatest depths occurring after precipitation events.

The bottom of the West-South Boundary Canal segment has significant plant cover. Vegetation has been observed to cover 75 to 100 percent of the sediment bed.

North-East Boundary Canal Segment

The North-East Boundary Canal segment begins at the north end of the base south of the former golf course at S.W. 280th Street (Walden Drive). It flows east past Mystic Lake and along the north and east perimeters of the base. The North-East Boundary Canal segment leads to the Stormwater Reservoir in its northeast corner. The total length of the North-East Boundary Canal segment is approximately 15,400 feet (2.9 miles).

The width of the North-East Boundary Canal segment ranges from 5 feet at the upper reaches (in urbanized areas) to 20 to 35 feet in other areas. Total depth of the canal ranges from 4 to 6 feet; water depth generally ranges from 3 to 6 feet, with the greatest water depths occurring after precipitation events.

The bottom of the North-East Boundary Canal segment has significant plant cover. Vegetation has been observed to cover 75 to 100 percent of the sediment bed.

Flightline Canal and Other Drainage Canals

The primary Flightline Canal generally runs parallel to and is located southeast of the base flightline. Secondary drainage canals connect the primary Flightline canal with the parallel canal north of the flightline and run beneath the flightline. The primary Flightline Canal leads into the West-South Boundary Canal segment at a point approximately 1,000 feet west of the reservoir. The primary Flightline Canal is approximately 19,400 feet long (3.7 miles) and the secondary canal is approximately 4,200 feet long (0.8 miles). Its width ranges from 20 to 30 feet and is generally consistent throughout its length. Total canal depth ranges from 3 to 6 feet while water depth ranges from 2 to 6 feet. The flightline canal has significant plant cover.

Several canals receive stormwater runoff from other areas of the base. The system that drains the eastern portions of the base includes three canals that run parallel to Bikini and St. Lo Boulevards. One canal is located just north of St. Lo Boulevard, one is located between St. Lo and Bikini Boulevards and one is located just south of Bikini Boulevard. These canals converge along Schweinfurt Road and lead to the North-East segment of the Boundary Canal. The total length of these drainage canals is approximately 12,800 feet (2.4 miles).

A drainage canal is also located on the western edge of the base. This canal begins along Westover Road and runs to the northwest, bends to the west, and connects to the West-South segment of the Boundary Canal. This canal is approximately 2,200 feet long (0.4 miles).

In addition to the primary and secondary Flightline Canals described, a drainage canal is also located near the southwest end of the flightline and taxiway. This canal runs southwest past the Ordnance Storage Area and enters the West-South segment of the Boundary Canal just southwest of the runway. It is approximately 3,800 feet long (0.7 miles).

The widths of these drainage canals range from 5 to 20 feet. Total canal depths range from 3 to 5 feet, while water depths are highly variable and range from less than one foot to 5 feet.

The east and west drainage canals are very highly vegetated by cattails and ferns, which cover virtually all of the sediment bed in these canals. In many locations, cattails extend above the top of the canal banks. Where cattails are not present, the canal bed is covered by algae and/or ferns.

Stormwater Reservoir

The Stormwater Reservoir is located on the east side of the base at the convergence of the West-South and North-East segments of the Boundary Canal. The reservoir is approximately 300 feet wide and 900 feet long and typical depths range from 10 to 20 feet. A control structure (pumphouse) is located at the eastern edge of the reservoir. This control structure discharges water into the Outfall Canal from the reservoir when the water level of the base reaches above a critical level

A list of important OU 9 Boundary Canal System historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Initial Site Investigation	1991 & 1992
Designated OU	1993
RI/BRA	1995
ROD Submitted	1997
ROD Rescinded	2001

3.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

In 1991 and 1992, sediment and surface water samples were collected at 18 locations from the Boundary Canal. SVOCs, metals, and pesticides were reported in the 18 sediment samples. In 1995 a RI/BRA was implemented to determine the nature and extent of contamination, evaluate the fate and transport of contamination, and assess the risks to human health and the environment. The results of this study indicated that there were no unacceptable human health risks or ecological risks posed by OU 9.

Voluntary custodial actions (VCAs) were completed in the drainage swales, ditches, and canals associated with the former oil/water separator (OWS) Numbers 792, 795, 779, 4787, and 723 (OU 6); OU 4 (located on the AFRC portion of the former base); and OU 5 (same as OU 4). Each of the former OWSs discharged directly to the drainage swale or canal. The areas of the discharge were sampled during the closure of each OWS. Results

from these samples exceeded site-specific or FDEP soil cleanup goals for various target analytes. Based on exceedances of the goals, VCAs were performed at the request of the FDEP and DERM to remove the soil and/or sediment from the areas. After the excavation of materials, confirmation sampling of the excavation sidewall and floors was conducted to verify that this contamination had been removed.

In addition to the VCAs, general housekeeping activities were conducted in the Boundary Canal by Miami-Dade County Aviation Department (MDAD) in 1995 to remove debris material associated with Hurricane Andrew, vegetative overgrowth, and associated materials.

Based on the results of the RI/BRA, this site was recommended to move to the ROD stage of the CERCLA process.

3.3 REMEDIAL ACTIONS

3.3.1 Remedy Selection

A No Remedial Action response or No Further Action has been selected for OU 9 based on the evaluation of the extensive data collected during the RI. These data and supporting studies indicate that the sediment and surface water in the Boundary Canal do not pose an unacceptable risk to human health or the environment.

However, during the course of the OU 11 investigation, the Air Force voluntarily rescinded the OU 9 ROD to accomplish the following:

- Develop a basewide screening ecological risk assessment (SERA) of OU 9/OU 11; and
- Incorporate portions of the OU 9 reservoir into the development of appropriate remedial alternatives at OU 11.

By taking these actions, OU 9 will be recommended for NFRAP and has been presented in the ROD for the aquatic portion of OU 11 (the Outfall Canal).

3.3.2 Remedy Implementation

Not applicable.

3.3.3 System Operations/Operation and Maintenance

Not applicable.

3.4 FIVE-YEAR REVIEW PROCESS

3.4.1 Document Review

This five-year review consisted of a review of relevant documents including monitoring data. Applicable sediment and surface water cleanup standards were reviewed.

3.4.2 Data Review

Not applicable.

3.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 9 area. No unusual observations were documented during this visit.

3.5 TECHNICAL ASSESSMENT

Not applicable.

3.6 ISSUES

Not applicable.

3.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The remedy of No Further Remedial Action Planned will be recommended in the ROD for OU 9 for regulatory concurrence.

3.8 PROTECTIVENESS STATEMENT

The remedy at OU 9 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

3.9 NEXT REVIEW

The next five-year review for OU 9 is required by December 2007, five years from the date of this review.

4.0 OPERABLE UNIT 10

4.1 HISTORY OF CONTAMINATION

This site (Site LF-12/OU 10, formerly LF-1) was a former landfill for general refuse generated on base. It is located in the southern portion of the base, near the base boundary, in the undeveloped marshlands between the existing runway and the Boundary Canal (Figure 5). The site is approximately 750 feet by 2000 feet and includes two small lakes.

Pan American Air Ferries, Inc. operated the site as an open dump prior to government acquisition of the area in 1943. In 1943, operation of this area was changed to cut and fill procedures wherein the top two feet of soil were removed, then refuse was spread out and covered with soil. General refuse was reportedly disposed and no burning of waste was conducted at the site.

Operation of the landfill continued until 1946 when the base was destroyed by a hurricane. Some additional waste may have been deposited in the area between 1946 and 1955. When the base was reactivated in 1955, newly generated refuse was taken off-site for disposal.

A list of important OU 10 Landfill Area (Site LF-12, formerly LF-1) historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Operation as AF Landfill	1943-1955
Initial Site Investigations	1983
Preliminary Assessment/Site Inspection (PA/SI)	1993, 1995
Extended Site Investigation/Preliminary Risk Evaluation	1996
Site Closure	1997

4.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

The initial investigation performed at the site was Phase I of the IRP and was completed in August 1983. The site received a low Hazard Assessment Rating Methodology score. Therefore, the IRP Phase I Records Search Report concluded that further investigative activities were not warranted.

In 1990 a Draft Decision Document concluded that OU 10 posed no significant threat to public health or the environment and recommended a No Further Action alternative. Subsequent review by the USEPA produced comments requiring site sampling and analysis to further evaluate impacts of the previous disposal activities.

In 1993 a PA/SI was conducted. Exceedences of PAHs and metals were discovered. Based on these findings, additional groundwater and soil sampling as a part of the Confirmation Sampling Program was recommended. Results indicated that no contaminants exceeded remedial goals (RGs) in the soil and only antimony and manganese were detected in the groundwater.

4.3 REMEDIAL ACTIONS

4.3.1 Remedy Selection

Based on the results of the 1993 and 1995 sampling activities and the findings of the preliminary risk evaluation, No Further Investigation was recommended and accepted for OU 10 in 1997.

4.3.2 Remedy Implementation

Not applicable.

4.3.3 System Operations/Operation and Maintenance

Not applicable.

4.4 FIVE-YEAR REVIEW

4.4.1 Document Review

This five-year review consisted of a review of relevant documents including monitoring data. Applicable groundwater and soil standards were reviewed.

4.4.2 Data Review

Not applicable.

4.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 10 area. Several monitoring wells were observed and subsequently abandoned in place in October 2002. No other observations were documented during this visit.

4.5 TECHNICAL ASSESSMENT

Not applicable.

4.6 ISSUES

Not applicable.

4.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

OU 10 received NFRAP concurrence from the USEPA on September 24, 1997; therefore, there are no further required actions. Thus OU 10 will not be subject to another five-year review.

4.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the Extended Site Investigation and Preliminary Risk Evaluation have been met at OU 10 and found to be protective of human health and the environment.

4.9 NEXT REVIEW

As this OU has received closure, the site will not be included in the next five-year review.

5.0 OPERABLE UNIT 11

5.1 HISTORY OF CONTAMINATION

OU 11 includes the former Ash Incinerator/Sewage Treatment Plant Disposal Area (Sites WP-23 and LF-19, formerly D-1 and D-2, also known as the "terrestrial sites") and the Outfall Canal. The terrestrial sites (the Ash Incinerator/Sewage Treatment Plant Disposal Area) are located in the southeastern corner of the base near the property boundary (Figure 6). These sites comprise an area of approximately 3.5 acres and are bordered on the east, south and west by agricultural fields and to the north by the Boundary Canal Reservoir and pumphouse. The Outfall Canal portion of this operable unit extends from the stormwater reservoir approximately two miles east to Biscayne Bay (Figure 4). Outfall Canal is man-made and was designed to reduce surface flooding of Homestead AFB.

The incinerator was operated at the base from the mid-1950s to the late 1950s, or possibly the early 1960s, after which it remained idle until it was dismantled in the late 1970s. The incinerator was constructed at the sewage treatment plant for the incineration of solid wastes generated at the base. Ash from the incinerator was reportedly disposed of along the eastern boundary of the site.

The sewage treatment process utilized primary clarification, trickling filters, secondary clarification, anaerobic sludge digestion, and sludge drying beds. The plant treated all domestic and industrial wastewater generated on the base from the 1950s to early 1983. The plant was taken out of service and demolished by base personnel in 1983. The sludge from the drying beds was reportedly spread on the ground surrounding the treatment plant. Wastewater from the base is currently discharged to a regional wastewater treatment system.

The Outfall Canal had previously been a part of the OU 9 Boundary Canal site, but was removed for further evaluation as part of OU 11 (as requested by the BCT).

A list of important OU 11 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Operation as AF Wastewater Treatment Plant	1950s-1983
Operation of AF Ash Incinerator	1950s – 1960s
Initial Site Investigations	1983
Decision Document	1990
PA/SI	1993, 1995
Extended Site Investigation/Preliminary Risk Evaluation	1996
RI/BRA	1998
Interim Remedial Action – Terrestrial Sites	1999
Focused FS - Outfall Canal	2001
Proposed Plan	2001
ROD	2002

5.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

The initial investigation performed for LF-19 and WP-23 (OU 11) was Phase I of the IRP. IRP Phase I activities were completed in August 1983 and were limited to a historical records search and interviews with Base personnel. The Phase I Report concluded that these sites had a low potential for contaminant migration and that further investigative activities were not warranted.

Draft Decision Documents developed in 1990 concluded that the OU 11 posed no significant threat to public health or the environment and concluded that the No Further Action alternative was appropriate. However, review by USEPA produced comments requiring sampling and analysis at these sites to further evaluate impacts from previous operations.

In 1993 a Preliminary Assessment/Site Investigation was conducted at the site. Soil and groundwater samples were taken and analyzed. Arsenic and lead were found in the soil; arsenic, manganese and iron were discovered in the groundwater.

Based upon the detection of potential contaminants of concern, additional soil and groundwater sampling as part of the Confirmation Sampling Program was recommended. In addition, sediment and surface water samples were collected from the discharge line into Outfall Canal. A Risk Evaluation was then conducted. A review of the data indicated that compounds in exceedence of industrial and residential Risk-Based Concentrations (RBCs) in soil included benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, 4,4-DDT, chlordane, antimony, arsenic and beryllium. Exceedences of the above-referenced RBCs in groundwater included 1,2-dichloroethene, tetrachloroethene, arsenic and beryllium. No compounds detected in surface water exceeded the screening criteria; however, compounds exceeding the screening criteria for sediments included chlordane, 4,4-DDE and 4,4-DDT.

These findings were then compared with the federal, state and local risk-based guidance. Only arsenic and lead were found to be in exceedence of these benchmarks in soil; arsenic and lead exceeded in groundwater. Chlordane, 4,4-DDE and 4,4-DDT exceeded the sediment screening benchmarks and it was stated that, due to the ecological significance of the presence of these compounds, further evaluation might be necessary. Thus, the site was recommended to proceed to the RI/FS stage of CERCLA.

In 1999, Interim Remedial Actions (IRAs) were conducted on the terrestrial portions of OU 11. The IRA consisted of removal and disposal of approximately 320 tons of contaminated soil/limestone from four areas of concern at the site (Excavation Areas 1-4, Figure 7). The contaminants of concern were arsenic and lead. Regulatory responses to the post-IRA Report (*Final ROD Implementation Report for OUs 26, 28, 29 and IRAs*) stated that "No additional excavation work is warranted on the land portion of this OU. However, I recommend that the BCT delay any action at this OU until the issue of the Outfall Canal is resolved." (FDEP letter December 13, 2000, Jorge Caspary).

In 2000, a Final RI/BRA Report was prepared for OU 11. The Purpose of the RI/BRA Report was to further evaluate the nature and extent of contaminants present at the site, to perform fate and transport modeling, and evaluate the potential risks to human health and the environment.

Based on the findings of the RI/BRA investigations, there does not appear to be significant impact to the soil or groundwater at the Ash Incinerator/Sewage Treatment Plant Disposal Area. Groundwater exceeded acceptable risk levels due primarily to arsenic concentrations. However, the likely source area of the arsenic contamination was eliminated during the 1999 IRA.

The SERA indicated a potential risk to sensitive ecological receptors in the Outfall Canal and Biscayne National Park due to concentrations detected in canal sediments. Surface water results did not indicate significant impacts to the Outfall Canal. Risks to current and potential future receptors to soils at the Sewage Treatment Plant were within USEPA acceptable levels. Impacts to the Outfall Canal as a result of past operations, as determined in the Baseline Human Health Risk Assessment, did not include significant levels of contaminants that would adversely affect human receptors.

Based on the results of the SERA and concurrence by the BCT, a focused FS was recommended to address the potential risks to sensitive ecological receptors exposed to canal sediment. Additionally, the focused FS addressed the reduction of future transport of sediment from OU 9, primarily the stormwater reservoir into the

Outfall Canal. The focused FS also addressed the closure of the open manholes and conduits located at the former sewage treatment plant. Also at this time it was determined by the BCT, that only the Outfall Canal portion of OU 11 would be pursued to the ROD phase. The terrestrial portions of OU 11 (the former Ash Incinerator/Sewage Treatment Plant Disposal Area) would be handled under a separate ROD once land use control issues were resolved. It was also decided that the final action for OU 9 would be considered in the ROD for the Outfall Canal.

A Proposed Plan and subsequently a draft ROD were developed for the site.

5.3 REMEDIAL ACTIONS

5.3.1 Remedy Selection

The selected alternative per the draft ROD is:

Alternative 3: OU 9 Sediment Transport Control Structure, Support of DERM's Pilot Wetland Project and Total Encapsulation of the Outfall Canal

The details of this alternative, as per the Proposed Plan, are as follows:

- Placing a sediment control structure in the reservoir before stormwater enters the Outfall Canal to eliminate future transport of contaminated sediment into the canal.

- Encapsulating contaminated sediment in the Outfall Canal to prevent migration to Biscayne National Park and protect the marine and fresh water environment from potential ecological risks.

In addition to the RAs, the Air Force proposes to support a DERM pilot wetland project planned for construction adjacent to the Outfall Canal. The support will be provided in the form of reimbursement for the following tasks, not to exceed $800,000:

- Purchase and install submersible pumps
- Provide necessary power to the site to operate the pump system
- Construct and install pump well housing
- Install intake box with manatee exclusion grate/trash rack
- Install two discharge culverts with stabilizer headwall
- Construct a fill pad for pump station
- Construct a culvert connecting the pilot project with the L31 Canal

Additionally, during the course of the OU 11 investigation, the Air Force voluntarily rescinded the OU 9 ROD to accomplish the following:

- Develop a basewide SERA of OU 9/OU 11

- Incorporate portions of the OU 9 reservoir into the development of appropriate remedial alternatives at OU 11

By taking these actions, OU 9 has been recommended for NFRAP.

5.3.2 Remedy Implementation

Field work to commence December 2002 and completed Summer 2003.

5.3.3 System Operations/Operation and Maintenance

The operations/operation and maintenance of the system will be evaluated after one year of operation following installation.

5.4 FIVE-YEAR REVIEW

5.4.1 Document Review

This five-year review consisted of a review of all relevant documents for the site(s).

5.4.2 Data Review

Not applicable.

5.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 11 area. No unusual observations were documented during this visit.

5.5 TECHNICAL ASSESSMENT

Not applicable.

5.6 ISSUES

Not applicable.

5.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the remedy be implemented following the approval of the ROD.

5.8 PROTECTIVENESS STATEMENT

The intent and goals of the ROD for OU 11 will be protective of human health and the environment.

5.9 NEXT REVIEW

The next five-year review for OU 11 is required by December 2007, five years from the date of this review.

6.0 OPERABLE UNIT 14

6.1 HISTORY OF CONTAMINATION

The former Drum Storage Area (Site SS-26) is located in the central portion of the base, near the current flightline (Figure 8). The site consists of a former drum storage area northwest and adjacent to Building 720. Fifty-five-gallon drums of paint and solvent related wastes were stored on the west side of Building 720 from the early 1980s through 1985. Records indicated that no significant spills occurred at the site while it was in service. Building 720 was formerly used as an aircraft painting facility. The site is no longer in operation and all surficial features have been dismantled.

A list of important OU 14 Drum Storage Area (Site SS-26) historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Operation as Drum Storage Area	1980s - 1985
Initial Site Investigations	1983
PA/SI	1993, 1995
Extended Site Investigation/Preliminary Risk Evaluation	1997
IRA	1999
No Further Investigation w/Deed Notification	2000

6.2 INITIAL RESPONSE and BASIS FOR TAKING ACTION

The initial investigation conducted for OU 14 was Phase I of the IRP and was completed in August 1983. The IRP Phase I Report concluded that the site had a low potential for contaminant migration and therefore further investigative activities were not warranted.

In 1990 a Draft Decision Document concluded that OU 14 posed no significant threat to public health or the environment and recommended that a No Further Action alternative was appropriate for the site. However, review by USEPA produced comments requiring sampling and analysis to further evaluate impacts of previous site related activities.

In 1993 a PA/SI was conducted to evaluate potential hazards and determine if further action at the site was necessary. Sampling and analysis conducted at the site indicated that arsenic was present in the soil, but there were no groundwater exceedences for any compounds.

In 1995 additional sampling was conducted as part of the Confirmation Sampling Program. Sampling and analysis indicated that benzo(a)pyrene, benzo(b)fluoranthene and arsenic were detected in soils above established benchmarks. No compounds were detected in the groundwater exceeding established benchmarks.

Based on results of 1993 and 1995 sampling activities, the Air Force recommended No Further Investigation for the site. However, an IRA was implemented at the site to address elevated levels of arsenic and PAH at two locations.

6.3 REMEDIAL ACTIONS

6.3.1 Remedy Selection

The selected IRA consisted of soil removal and disposal from two areas of concern at the site. The contaminants of concern were arsenic and PAHs. Soil was removed in the vicinity of soil borings SS26-SL-0004 and SS26-SS-0003.

6.3.2 Remedy Implementation

In 1999, an IRA was conducted. This IRA consisted of removal and disposal of approximately 70 tons of contaminated soil/limestone at two areas (Excavation 1 and 2, Figure 9). The contaminant of concern (COC) at Excavations 1 and 2 was arsenic, and PAH, respectively. Details of each excavation are as follows:

Excavation 1

- Exceedences were observed in sidewall and floor samples
- The southern end of the excavation was extended to asphalt pavement
- The areal extent of the excavation was increased 20 feet north and 5 feet west
- Analytical results from soil samples from the additional excavations exceeded the remedial goal (RG) on the north end of the excavation, and did not exceed the RG for arsenic on the west side of the excavation
- The excavation was 5 feet deep, which is below the direct exposure pathway
- An additional 40 tons of soil were removed and disposed from the excavation
- IRA actions are complete

Excavation 2

- Exceedences were observed in sidewall and floor samples
- The excavation was 2 feet deep, which is below the direct exposure pathway
- Because the excavation is bordered by asphalt and concrete on all sides, additional excavation work was not completed since the paved surfaces act as a cap to prevent rainwater from infiltrating to the soil and prevent direct exposure to contaminated soil
- IRA actions are complete

In December 2000 it was determined that "No additional excavation work is warranted at the OU. The proposal to address exceedences of PAHs in soil via deed transfer documents is acceptable" (FDEP letter dated December 13, 2000, Jorge Caspary).

6.3.3 System Operations/Operation and Maintenance

Not applicable.

6.4 FIVE-YEAR REVIEW

6.4.1 Document Review

This five-year review consisted of a review of all relevant documents for the site.

6.4.2 Data Review

Not applicable.

6.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 14 area. No evidence of surficial contamination or erosion was documented during this visit.

6.5 TECHNICAL ASSESSMENT

Not applicable.

6.6 ISSUES

Not applicable.

6.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

As OU 14 has received No Further Investigation with Deed Notification approval, there are no further required actions.

6.8 PROTECTIVENESS STATEMENT

Based on the completed Interim Remedial Action activities, objectives of the recorded remedy were achieved and found to be protective of human health and the environment.

6.9 NEXT REVIEW

OU 14 will not be subject to another five-year review.

7.0 OPERABLE UNIT 16

7.1 HISTORY OF CONTAMINATION

During the early to mid 1970s, Homestead AFB was a host facility for a U.S. Army Hawk Missile Battery located off the northeastern end of the main runway and near Building 4072 (Figure 10). The area, also known as Structure 898, was originally surrounded by earthen berm walls (approximately 7 feet high by 12 feet wide) with native bedrock acting as the primary ground surface for the missile launch pads. The area is approximately 120 feet by 120 feet. Following deactivation as a missile pad, 55-gallon drums of paint thinners, pesticides, motor oils, and hydraulic oils were stored at the site. Interviews conducted by Air Force personnel with base employees also revealed that open dumping occurred within the bermed area between 1973 and 1978, which reportedly resulted in ecological stress to the vegetation near the driveway entrance to the structure. During the 1980s, the ground surface within the bermed area was covered by asphalt and was used as a parking compound.

A list of important OU 16 Hawk Missile Site/Drum Storage Area historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Operation as Hawk Missile Site/Drum Storage Area	1970s
PA/SI	1997
Site Closure	1997
IRA	1999
No Further Action confirmed	2000

7.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

In 1997 a PA/SI was completed to determine the vertical and horizontal extent of potential soil and groundwater contamination associated with the previous operations at the site. The results of sampling and analysis conducted at the site revealed exceedences of arsenic in the soil and antimony in the groundwater. Sediment samples taken from a drainage ditch located adjacent to the site indicated exceedences of arsenic, cadmium, 4,4-DDD, 4,4-DDE and 4,4-DDT.

7.3 REMEDIAL ACTIONS

7.3.1 Remedy Selection

Based on the results of the PA/SI, the Air Force recommended No Further Action for the site. Site closure was received April 9, 1997; however an IRA was proposed to address the exceedances of arsenic and pesticides in the drainage ditch sediments adjacent to the site.

7.3.2 Remedy Implementation

An IRA was conducted in 1999, which consisted of removing and disposing of approximately 20 tons of contaminated sediments from the drainage ditch located east of Structure 898 (Areas 1, 2, and 3, Figure 11). The COCs were arsenic and pesticides. Following these IRA activities, additional "hot spot" removal actions were undertaken in May 2000. This action removed the remaining sediments (approximately 12 tons) from the OU 16 ditch. In October 2000, the Air Force requested confirmation of No Further Action for OU 16.

7.3.3 System Operations/Operation and Maintenance

Not applicable.

7.4 FIVE-YEAR REVIEW PROCESS

7.4.1 Document Review

This five-year review consisted of a review of all relevant documents for the site.

7.4.2 Data Review

Not applicable.

7.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 16 area. No unusual observations were documented during this visit.

7.5 TECHNICAL ASSESSMENT

Not applicable.

7.6 ISSUES

Not applicable.

7.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

As OU 16 has received No Further Action, there are no further required actions.

7.8 PROTECTIVENESS STATEMENT

Based on the completed Interim Remedial Action activities, the intent and goals of the Preliminary Assessment/ Site Investigation at OU 16 have been met and found to be protective of human health and the environment.

7.9 NEXT REVIEW

OU 16 will not be subject to another five-year review.

8.0 OPERABLE UNIT 17

8.1 HISTORY OF CONTAMINATION

Building 793 was used as a C-130 maintenance hangar by the 301st Air Rescue Squadron (a Homestead AFB tenant organization) (Figure 12). During Hurricane Andrew, this building was destroyed and a C-130, parked on the concrete apron in front of the hangar, was partially torn apart, resulting in a JP-4 fuel release from one of the aircraft's wings. It was estimated that approximately 2,000 gallons of fuel were in the wing when the fuel spill occurred. The release of the JP-4 was believed to be limited to each side of the concrete apron and the area where one of the wings landed (a grassy swale located along Bull Run to the northwest of former Building 793).

A list of important OU 17 Former Building 793 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Release	1992
PA/SI	1995 - 1997
Site Closure	1997

8.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

In 1995 a PA/SI was implemented to evaluate the vertical and horizontal extent of potential groundwater and soil contamination associated with the JP-4 fuel spill and to determine if additional action was necessary at the site. The selection of the soil boring/monitoring well locations was based upon site topography and information about where and how the spill occurred. Two soil borings/monitoring wells were placed in unpaved low spots on either side of the concrete apron in front of the hangar where the C-130 was parked prior to the hurricane. Based upon the local topography, if a release occurred here prior to the wing being ripped off, the resultant runoff would most likely have entered one or both of these unpaved grassy areas. The wing containing the fuel tank that ruptured was eventually blown into the shallow swale to the northwest of former Building 793. Three additional soil borings/monitoring wells were placed in this swale to assess the potential for soil and/or groundwater contamination.

The results of the sampling and analysis for this OU indicated that there were no exceedences in soil or groundwater. Therefore, a No Further Action was recommend for the site.

8.3 REMEDIAL ACTIONS

8.3.1 Remedy Selection

Based on the results of the 1995 PA/SI, the Air Force recommended No Further Action for the site. Site closure was granted in 1997.

8.3.2 Remedy Implementation

Not applicable.

8.3.3 System Operations/Operation and Maintenance

Not applicable.

8.4 FIVE-YEAR REVIEW PROCESS

8.4.1 Document Review

This five-year review consisted of a review of all relevant documents for the site.

8.4.2 Data Review

Not applicable.

8.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 17 area. No unusual observations were documented during this visit.

8.5 TECHNICAL ASSESSMENT

Not applicable.

8.6 ISSUES

Not applicable.

8.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

As OU 17 has received No Further Action approval, there are no further required actions.

8.8 PROTECTIVENESS STATEMENT

The intent and goals of the Preliminary Assessment/ Site Investigation at OU 17 have been met and found to be protective of human health and the environment.

8.9 NEXT REVIEW

OU 17 will not be subject to another five-year review.

9.0 OPERABLE UNIT 18

9.1 HISTORY OF CONTAMINATION

The former contractor storage area was used to store various materials including pipes, equipment, cans of paint, empty containers and tools since the early 1980s. The former construction debris landfill was used for disposal of crushed asphalt, most likely generated from the occasional resurfacing of runways. The site occupies an area of approximately 2.5 acres near the corner of Bikini Boulevard and Schweinfurt Road at the northeastern edge of the base (Figure 13). The southern and southwest edge of the operable unit is bounded by grass, brush and small trees, while the north and west sides are bounded by canals.

A list of important OU 18 Contractor Storage Area/Construction Debris Landfill historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Operation as Contractor Storage Area/Construction Debris Landfill	1980s to 1995
Preliminary Investigation	1994
RI/BRA	1997
FS	1997
ROD	1998
ROD Implementation	1999
ROD Implementation Report	2000
Semi Annual Groundwater Sampling	ongoing

9.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

Preliminary investigations were completed for OU 18 as part of the Confirmation Sampling Program. PAHs and pesticides were detected in the soils and groundwater at the site. Based on these results, a RI/BRA was conducted at the site. Sampling and analysis revealed that the soil (primarily surface soils) at the site had exceedences of PAHs, SVOCs, and pesticides. There were some slight exceedences in groundwater of PAHs, specifically benzo(a)pyrene. PAHs and arsenic were detected in sediments adjacent to the site. As a result of this evaluation, it was determined that the contaminants found at the site in surface soils posed a potential unacceptable risk to human health. Thus, the site was recommended for a FS.

Based on the results of the FS, a ROD was required for the OU.

9.3 REMEDIAL ACTIONS

9.3.1 Remedy Selection

The remedy selected for OU 18 was identified in the Final ROD as Alternative OU 18-3, Soil Cover. This alternative included the removal and consolidation of asphaltic sediments (a potential source of PAH contamination) from both the Boundary Canal (north of the site) and the drainage canal (northwest of the site). This alternative also required excavation of all existing asphalt fill material within 15 feet of the edge of the canals to create a buffer zone between the fill area and the canals. Additional asphalt fill might be excavated as warranted.

The excavated sediments and fill materials were to be placed and compacted on top of the existing pile of asphalt located in the middle of OU 18. The sides of the pile were to be graded with a slope no greater than 3 feet horizontal to 1 foot vertical. After excavation, placement, compaction, and sloping tasks were completed, a

2 foot thick mixed cover was to be placed over the entire pile. Erosion protection was to be placed on the side slopes adjoining the banks of the canals.

This alternative also mandated institutional controls by way of perimeter fencing with warning signs and a long-term groundwater monitoring program.

9.3.2 Remedy Implementation

In 1999 the ROD was implemented. Approximately 22,000 tons of material was moved to restore the site. The landfill is capped by 18 inches of limerock (35,000 tons of clean fill), six inches of topsoil, and sod. Perimeter fencing has been installed. As part of the ROD, semiannual groundwater sampling (for acetone, carbazole, 3,3' dichlorobenzideine, aldrin, chlordane, 4-4'-DDE, dieldrin, heptachlor epoxide, methoxychlor, PAHs, antimony, chromium, iron, manganese and ammonia) is ongoing.

9.3.3 System Operations/Operation and Maintenance

Groundwater monitoring wells will be maintained for sampling for at least five years, and if sampling is to continue, for up to 30 years. Well maintenance includes aboveground inspection and painting well covers, so that the wells can be easily identified in the field. Locks will be replaced, if necessary, to secure the monitoring wells from unauthorized entry. If filter pack and screens become plugged by sediment or biological growth, they will be cleaned in accordance with accepted methods prior to sampling events.

9.4 FIVE-YEAR REVIEW

9.4.1 Document Review

This five-year review consisted of a review of all relevant documents, including monitoring data

9.4.2 Data Review

Review of records and monitoring reports through April 2002 indicates that three years of semi annual monitoring and sampling events have been conducted (Figure 14). The most recent round of sampling (April 2002) indicates that only PAHs and metals are of concern and of these, detection rates have been reduced. The other contaminants of concern are not detected or are below their respective FDEP groundwater cleanup target levels (GCTLs).

The following conclusions have been developed based on the findings of the April 2002 groundwater sampling and analysis event (See Table 2 for analytical results):

- Groundwater elevations decreased an average of 0.88 feet from October 2001. Historically, groundwater elevations are higher in October as compared to April.
- There have been no detections of the volatile organic compound acetone above the GCTL in any of the wells sampled for four consecutive sampling events.
- The semivolatile organic compound 3,3'-dichlorobenzidine has not been detected in any samples collected during the past four sampling events. During the same four sampling events, there have been no detections of the semivolatile organic compound carbazole in three of the four wells sampled. Detected concentrations of carbazole have been below the GCTL in the remaining well, OU18-MW2R, for three consecutive sampling events.
- Ten PAHs were detected above GCTLs.
- Pesticides have not been detected in any of the samples collected from three of the four wells during the past four sampling events. Detected concentrations of the pesticides heptachlor epoxide, DDE, 4,4; and

chlordane have been below GCTLs in the remaining well, OU18-MW4R. No pesticides were detected in the most recent round of monitoring at well OU18-MW4R.

- Iron and manganese continue to be detected at concentrations above GCTLs in three of the four wells sampled.
- Ammonia continues to be detected at concentrations above the GCTL in all of the wells sampled.

The next semiannual groundwater sampling event is scheduled for October 2002 at which time monitoring wells OU18-MW1R, MW2RA, MW3R, and MW4R will be sampled. Because the detected concentrations of pesticides, the volatile organic compound acetone, and the semivolatile organic compounds carbazole and 3,3'-dichlorobenzidine have remained below GCTLs in each of the locations sampled for no less than three consecutive sampling events, it was recommended and subsequently approved by the regulators that sampling for these analytes be discontinued.

9.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 18 area. No unusual observations were documented during this visit.

9.5 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions and results of the site inspection indicates that the remedy is functioning as intended by the ROD.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes to the physical conditions of the site that would affect the protectiveness of the remedy. Furthermore, the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no other information that calls into question the protectiveness of the remedy.

9.6 ISSUES

None.

9.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The continuation of the groundwater monitoring program is recommended for this OU, until such time as the regulatory agencies agree that monitoring is no longer required.

9.8 PROTECTIVENESS STATEMENT

The remedy at OU 18 is expected to be protective upon completion and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

9.9 NEXT REVIEW

The next five-year review for OU 18 is required by December 2007, five years from the date of this review.

10.0 OPERABLE UNIT 20/21

10.1 HISTORY OF CONTAMINATION

OU 20/21 was a hazardous materials storage facility (OU 21, Building 619) for flammables and acids prior to Hurricane Andrew in 1992 (Figures 15 and 16). After the hurricane, a paved parking lot (OU 20) at the site was used as an outdoor staging area for collecting hazardous wastes. The Outdoor Staging Area (OU 20) occupies an area of 14,000 square feet near the intersection of St. Lo Boulevard and St. Nazaire Boulevard. The site is bounded by grass on the northwest and northeast, by Building 618 on the southwest and by OU 21 on the southeast. The Base Supply Hazardous Material Storage Facility, Building 619 (OU 21) occupies approximately 2,400 square feet and is located west of the Bikini Boulevard and St. Nazaire Boulevard intersection. The site is bounded by an asphalt parking lot (OU 20) to the northwest, and grass on the remaining sides.

A list of important OU 20/21 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
PA/SI	1996-1997
RI/BRA	1998
FS	1999
Draft Final ROD	1999
IRAs in Support of Proposed ROD	February-July 2001
IRAs in Support of Proposed ROD Report	December 2001
Biennial Groundwater Sampling	April 2003

10.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

Preliminary investigations were completed at this site as part of the Confirmation Sampling Program. This sampling program indicated that arsenic exceeded RBCs in soils and groundwater. Based on these results an expanded SI was conducted. This investigation concluded as there were arsenic exceedences in the soils and groundwater, the OU should move on to the RI stage of the CERCLA process.

Additionally, in 1994, a UST located near the northern end of the northwest side of Building 618 (OU 20) was excavated under the Base UST/OWS Remediation Program. No visual contamination was observed during the excavation activities. Subsequent sampling of a monitoring well installed in the previous excavation area revealed no contaminants of concern.

In 1996, a voluntary IRA was performed to remove relatively high concentrations of arsenic near the previous Confirmation Sampling Program soil boring locations. The excavation at OU 20 was centered on Confirmation Samples SM31-SS-01 and SM31-SS-02. Arsenic concentrations reported in sidewall and floor samples ranged from 2.1 to 21.2 mg/kg. A monitoring well was installed in the center of the excavation and subsequent sampling of the groundwater revealed an arsenic concentration of 80 µg/L. Approximately 100 tons of contaminated soil was removed at OU 20.

The excavation at OU 21 was centered on Confirmation Sample SM32-SS-03. Arsenic concentrations reported in sidewall and floor samples ranged from 1 mg/kg to 11.7 mg/kg. Approximately 140 tons of soil was removed at OU 21.

A RI/BRA was completed for the site in 1998. Additional soil boring/monitoring wells were installed at the sites. Sampling and analysis indicated that arsenic was still a contaminant of concern in the soils and groundwater at the sites. Arsenic was also found in sediments in the canal segment adjacent to OU 21. As a result of this information, it was determined that arsenic found at the sites posed a potential unacceptable risk to human health. Therefore, OU 20/21 was recommended for a FS.

Based on the results of the FS and the Proposed Plan, a ROD was developed for the site.

10.3 REMEDIAL ACTIONS

10.3.1 Remedy Selection

The remedies selected for these operable units were identified in the Draft Final ROD as:

Soil
OUs20/21-3S – Remove and Landfill

This alternative involves removal of soils containing arsenic at levels above the Homestead AFB specific soil cleanup goal for disposal in a solid waste (RCRA Subtitle D) landfill. This alternative would be implemented by:

- Removal of the upper 6 inches of impacted surface soils (estimated at 1,700 bulk cy). Removal would be done using appropriately sized, conventional earthmoving equipment.
- Backfilling the excavations with uncontaminated fill followed by regrading and revegetation of the ground surface.
- Transportation and disposal of excavated soils at a local solid waste (RCRA Subtitle D) landfill. The total estimated weight is 2,400 tons.

Groundwater
Ous20/21-2G – Groundwater Monitoring

This alternative includes groundwater monitoring of the arsenic plume and implementation of institutional controls. This alternative would be implemented by:

- Long-term groundwater monitoring of arsenic concentrations to document and quantify the concentrations of arsenic and associated risk to human health and the environment.
- Initial overdevelopment and resampling of all site monitoring wells with arsenic concentrations above the federal and state MCLs of 50 µg/L.
- Placing restrictions on current and future land and groundwater use in the contaminated area (e.g., restrict operation of Base supply wells and future groundwater users). Specific language regarding land use restrictions will be incorporated in the Finding of Suitability to Transfer (FOST) and approved by FDEP as a third-party beneficiary.

10.3.2 Remedy Implementation

Beginning February 2001, a voluntary IRA was implemented and followed the selected remedy in the unsigned Draft ROD OU 20/21, OU 30 and OU 31 (June 1999), despite the fact that the ROD had not been signed. Approximately 4,700 tons of contaminated soil/limestone (2,300 more tons than specified in the draft ROD) and 22 tons of sediment from the canal bordering OU 20 and a portion of OU 21 were removed and disposed of during implementation of the voluntary IRA. The following is a summary of activities and results for OU 20 (Figure 17):

- Exceedences of arsenic were observed in sidewall and floor samples
- Soil boring analytical results indicated elevated levels of arsenic were confined to the 1.0 to 1.5 foot depth interval
- The depth of the excavation was extended an additional 0.5 feet (1.0 feet total depth) over the entire site
- Two "hot spot" areas were extended an additional 1.0 feet (2.0 feet total depth)
- All the sediment (22 tons) was removed from the drainage ditch adjacent to OU 20
- One sample (OU20-SS4, 10.3 mg/kg) remained above the RG for arsenic. This sample location is adjacent to asphalt
- A statistical evaluation showed the 95th upper confidence limit (UCL) of the mean arsenic concentration decreased 95 percent (from 105 to 5.8 mg/kg) as a result of the removal action. This is below the base specific soil cleanup target level (SCTL) of 10 mg/kg
- Soil removal actions are complete

The following is a summary of activities and results for OU 21 (Figure 19):

- Exceedences of arsenic were observed in sidewall and floor samples
- Soil boring analytical results indicated elevated levels of arsenic were confined to the 1.0 to 1.5 foot depth interval
- The depth of the excavation was extended an additional 0.5 feet (1.0 feet total depth) over the entire site
- Four "hot spot" areas were extended and additional 1.0 feet (2.0 feet total depth)
- Five samples (OU21-SS13B, 19.8 mg/kg; OU21-SS15, 12.3 mg/kg; OU21-SS18, 34.8 mg/kg; OU21-SS19, 37.6 mg/kg; and OU21-D8, 107 mg/kg) remain above the base specific RG of 10 mg/kg for arsenic. Most of these locations are limited by physical constraints such as asphalt, canal edge, and the Building 619 footer
- A statistical evaluation showed the 95th UCL of the mean arsenic concentration decreased 68 percent (from 31 to 9.92 mg/kg) as a result of the removal action. This is below the base specific SCTL of 10 mg/kg
- Soil removal actions are complete

Also as part of this voluntary IRA, groundwater sampling and monitoring well overpumping was conducted. The results of the baseline monitoring revealed that three monitoring wells had arsenic concentrations in excess of 50 µg/L. Based on these results, the three monitoring wells were overpumped to potentially reduce the arsenic concentrations in the groundwater. Approximately 15,000 gallons of groundwater were pumped from each monitoring well. Subsequent sampling of the monitoring wells (after groundwater recovery) showed no appreciable affect on the arsenic concentrations.

10.3.3 System Operations/Operation and Maintenance

Following the voluntary IRA operations, groundwater samples were obtained from the existing monitoring wells located on the site. A summary of the results follows:

Three groundwater samples were collected from OU 20 monitoring wells (Figure 18). All samples were analyzed for arsenic, iron, and alkalinity. Arsenic was detected above the GCTL in monitoring well B618-MW-0001 at 0.0797 mg/L. Iron was not detected in any of the samples. The arsenic results were slightly increased from the previous sampling event (March 2001). Groundwater results are provided in Table 3.

Eight groundwater samples were collected from OU 21 groundwater monitoring wells (Figure 20). All samples were analyzed for arsenic, iron and alkalinity. Arsenic was detected in monitoring wells MW-0001 (0.158 mg/L) and MW-0002 (0.288 mg/L) above the GCTL. Iron was detected in MW-0008 (1.41 mg/L) above the secondary drinking water standard of 0.3 mg/L. Concentrations remained relatively unchanged from the previous sampling event in March 2001. Groundwater results are provided in Table 4.

10.4 FIVE-YEAR REVIEW

10.4.1 Document Review

This five-year review consisted of a review of all relevant documents.

10.4.2 Data Review

Not applicable.

10.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 20/21 area. No unusual observations were documented during this visit.

10.5 TECHNICAL ASSESSMENT

The USEPA Drinking Water Standard for arsenic will change from 50 µg/L to 10 µg/L effective January 23, 2006.

10.6 ISSUES

The change in the USEPA Drinking Water Standard for arsenic and its effect on the site will be addressed in the next five-year review.

10.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

A conference call was held on February 24, 2003 with FDEP, USEPA and DERM to discuss OU 20/21, 30 and 31. It was agreed that OU 20 would be subject to groundwater use restrictions and granted a No Further Action for soils. OU 21 would be subject to groundwater use restrictions and No Further Action with restrictions for soil along the footprint of Building 618. A statement regarding the relationship of the OU 9 canal system with the OU 21 groundwater and drainage ditch would be inserted to the forthcoming OU 20/21, 30 & 31 ROD. Biennial groundwater sampling will begin April 2003.

10.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the proposed ROD have been met at OU 20/21 and found to be protective of human health and the environment.

10.9 NEXT REVIEW

The next five-year review for OU 20/21 is required by December 2007, five years from the date of this review.

11.0 OPERABLE UNIT 22

11.1 HISTORY OF CONTAMINATION

This site is located along the edges of a large concrete and asphalt parking lot east of St. Nazaire and north of the main flightline (Figure 21). Five storage buildings, originally on site, have been removed. The site was originally identified as including two AOCs, 12 and 15.

During the 1993 visual inspection, oil staining and dead vegetation were observed beneath 55-gallon drums of mobile waste fuel and oil tanks located along a block wall at the southwest edge of the parking lot (AOC 12). Three ASTs, with approximately 1,000 gallon capacities, were located along the southeast edge of the parking lot (AOC 15). The tanks were contained in a 90-foot by 40-foot by 3-foot high sand and limestone berm with coarse limestone gravel in the bottom of the containment area. A fuel dispenser was located just outside the bermed area.

A list of important OU 22 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Visual Inspection	1993
Confirmation Sampling	1994
IRA	1996
RI	1996
Draft Final ROD (unsigned)	1998
IRA	1999
Confirmation Groundwater Sampling	2000
Monitoring Well Overdevelopment and Resampling	2000
Monitoring Well Replacement and Groundwater Sampling	2000
Draft Final ROD Addendum	2001

11.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

Preliminary investigations were completed at OU22 as part of the Confirmation Sampling Program in 1994. Investigative activities were concentrated around the former block wall on the southeast edge of the parking lot (AOC 12) and the former AST locations (AOC 15). Sampling activities included the collection of surface soil samples, subsurface soil samples, and groundwater samples. The results of the confirmation sampling are summarized below.

Former Block Wall (AOC 12)

BTEX compounds and 1,2-dichloroethene (DCE) were detected at elevated concentrations (up to 5,450 µg/L) in groundwater samples collected near the former wall. The highest concentration was reported in a Geoprobe® screening sample. The highest concentration reported in the groundwater sample were total xylenes from well SM12-MW1 at 1,800 µg/L. Arsenic and manganese were also detected in the groundwater at concentrations above background levels. PAHs and metals were detected in surface soil samples. However, the levels of PAHs appeared to be consistent with the concentrations of PAHs which appear to be widely distributed throughout the base. Elevated BTEX concentrations (up to 98 mg/kg of xylene) and total PAHs (3,610 mg/kg) were also detected in subsurface soils.

Former ASTs (AOC 15)

BTEX compounds, DCE, and metals above background concentrations were detected in groundwater samples collected near the former AST locations. The highest concentration was for xylene (15 µg/L) in a Geoprobe® screening sample. The highest concentration from the groundwater sample from well SM15-MW1 was 1,2,DCE at 2 µg/L. PAHs (maximum total concentration of 5.23 mg/kg) and metals (maximum concentration of 1,710 mg/kg for lead) above background levels were detected in surface soil samples. The PAH concentrations appeared to be consistent with PAH detections that have been recorded across the base.

An IRA was completed in 1996 to remove lead contamination in surface soil (1,710 mg/kg) detected in the area of the former ASTs. During excavation activities, petroleum contaminated soil was encountered and the size the excavation was enlarged. An area approximately 40 feet by 48 feet by 4 feet deep was excavated to remove the contaminated soil around the former ASTs. All contamination above FDEP action levels was removed during the IRA activities. The excavation was backfilled with clean fill material.

RI sampling activities were completed at OU22 in 1996. Surface soil samples collected in areas of likely site surface drainage accumulation indicated elevated concentrations of total PAHs, semivolatile organic compounds, and pesticides mainly in surface soil in the eastern portion of the site. Low concentrations of toluene were detected in many RI surface soil samples throughout the site. Lead was detected in surface soil in the western portion of the site.

Subsurface samples collected during the Confirmation Sampling indicated that high concentrations of total BTEX compounds and total PAHs were present in the southern portion of the site. A subsurface sample from a RI soil boring immediately west of this location had a lower concentration of total BTEX along with low concentrations of 1,1,2,2-tetrachloroethane, PAHs, and pesticides. The subsurface sample from the RI boring in the eastern portion of the site, outside the excavation for the lead removal, exhibited low concentrations of BTEX, PAHs, SVOCs, and pesticides. The lead concentration in this subsurface sample was below the background concentration.

Groundwater screening with Geoprobe® samples indicated that low concentrations of halogenated VOCs and relatively high concentrations of BTEX compounds were present in site groundwater, mainly in the southern portion of the site (AOC 12). Resampling of the monitoring wells installed during the Confirmation Sampling showed greatly decreased total BTEX concentrations in monitoring well SM12-MW1 (less than 10 µg/L) and no organics detected in monitoring well SM15-MW1.

Based on the results of the RI and previous investigations, a No Further Action ROD was prepared for this site in 1998. However, this ROD remained unsigned.

In July 1999, an IRA was initiated at OU22 in which soil contaminated with PAHs was excavated from five separate areas (Excavations A through E). The IRA was implemented to reduce the risk to human health caused by contact with elevated concentrations of PAHs in the soil. The initial excavation plan was to remove six inches of surficial soil at various locations that had exhibited elevated concentrations of PAHs in past sampling events. It was agreed by the BCT, where confirmation floor samples indicated the continued presence of PAHs in excess of the SCTLs, soil was removed to 2 feet below land surface (bls) or to competent rock and backfilled with clean fill to remove the direct exposure pathway. Additionally, where high concentrations were observed in sidewall samples abutting paved areas, the excavation was not continued since the paved surfaces act as a cap to prevent rainwater from infiltrating to the soil and thus preventing direct exposure to contaminated soil.

Between July 1, 1999 and July 6, 1999, IT Corporation excavated contaminated surface soils at five locations at OU22 (Figure 22). The contaminants of concern at each location were PAHs. Approximately 315 tons of contaminated soil/limestone were excavated as follows:

Excavation A – 50 tons
Excavation B – 160 tons
Excavation C – 70 tons
Excavation D – 35 tons

Monitoring well OU22-SM12-MW1 was sampled on January 11, 2000. The analytical results indicated the presence of benzene and naphthalene (5.1 and 3.8 [F] µg/L, respectively). Benzene exceeded the GCTL of 1 µg/L. The naphthalene concentration was flagged with a (F) qualifier indicating that the reported value was less than the reporting limit and greater than the method detection limit.

In an effort to reduce the benzene levels detected in monitoring well OU22-SM12-MW1, a monitoring well overdevelopment was completed in May 2000. Approximately 12,820 gallons of groundwater were removed from the well over a three-day pumping period. Subsequent groundwater sampling indicated that elevated concentrations of benzene were still present.

11.3 REMEDIAL ACTIONS

11.3.1 Remedy Selection

A Draft Final ROD Addendum was submitted to the regulators on June 4, 2001. This ROD Addendum proposed No Further Investigation with Deed Notification. DERM approved the document July 20, 2001. However, due to lack of consensus on Land Use Control language, the ROD has remained unsigned.

11.3.2 Remedy Implementation

Not applicable.

11.3.3 System Operations/Operation and Maintenance

On 18-May-00, a groundwater sample was collected for laboratory analyses from well SM12-MW1. Analytical results from the groundwater sample detected 11 µg/L benzene and 12 µg/L naphthalene. The benzene concentration exceeded the FAC Chapter 62-770, Table V guideline of 1.0 µg/L.

Groundwater analytical results of SM12-MW1 overdevelopment activities indicated the benzene concentration continued to exceed FAC Chapter 62-770 Table V guidelines. As discussed in the 1-Jun-00 BCT, the Air Force abandoned monitoring well SM12-MW1 and installed a replacement well (OU22-MW12R) within five feet of the well. The monitoring well was replaced to determine if the benzene detected in the well is representative of the aquifer or a relict of previous contamination that persists in the well sand pack material. Following installation of the replacement well, the Air Force collected a sample from the well for volatile organic aromatics (VOAs) analysis using SW846 Method 8260B.

On 6-Jul-00 a groundwater sample was collected for laboratory analyses from replacement monitoring well OU22-MW12R. Analytical results from the groundwater sample detected the following compounds at concentrations exceeding the FAC Chapter 62-777, Table 1, GCTL: benzene (9 µg/L); ethylbenzene (61 µg/L); isopropyl benzene (7 µg/L); naphthalene (27 µg/L); 1,2,4-trimethylbenzene (96 µg/L); 1,3,5-trimethylbenzene (18 µg/L); and m,p-xylene (33 µg/L).

Groundwater samples were taken from OU22-MW12R on July 16, 2002. Analytical results indicate that benzene (20.4 µg/L), isopropyl benzene (16.3 µg/L) and naphthalene (28.8 µg/L) were above GCTL. See Table 5 for analytical results.

11.4 FIVE-YEAR REVIEW PROCESS

11.4.1 Document Review

This five-year review consisted of a review of all relevant documents for the site.

11.4.2 Data Review

Not applicable.

11.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 22 area. No unusual observations were documented during this visit.

11.5 TECHNICAL ASSESSMENT

Not applicable.

11.6 ISSUES

None.

11.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The Air Force has formally requested that OU 22 be transferred to the State of Florida Petroleum Program (letter dated April 7, 2003). Once this OU is accepted into the Petroleum Program, the Air Force will request a No Further Action (NFA) with conditions (land use controls/institutional controls) and will provide recent data.

11.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the ROD have been met at OU 22 and found to be protective of human health and the environment.

11.9 NEXT REVIEW

The next five-year review for OU 22 is required by December 2007, five years from the date of this review.

12.0 OPERABLE UNIT 26

12.1 HISTORY OF CONTAMINATION

This site, also known as Building 745, was used for the maintenance of aircraft skin and hydraulics (Figure 24). Wastes, such as hydraulic fluid, were generated. As noted during a 1993 Visual Inspection, a sheltered concrete slab (labeled Building 746) to the southeast contained gas cylinders, flammable materials, and storage cabinets containing paints, solvents, and driveway sealer. Three transformers were reported to have been stored in a fenced area on the east side of the building. Also, two USTs were located on site.

A list of important OU 26 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Visual Inspection	1993
Confirmation Sampling	1994
UST Removal	1994
Interim Remedial Action	1996
RI/BRA	1997
Final ROD	1998
ROD Implementation	1999
Final ROD Implementation Report	2000
Groundwater Sampling	2000

12.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

In 1994, Confirmation Sampling was performed at the site. Significant levels of cis-DCE and TCE were detected in groundwater samples. In the surface soils, PAHs, pesticides, metals and PCBs were detected.

In January 1994, two USTs located just northeast of Building 746 were removed. While it was noted that the tanks were in good condition, a petroleum sheen was observed on the exposed groundwater in the excavation. The distribution lines were capped and soils were removed, with sidewall samples screened for organic vapors until found to be below 10ppm. All excavated soils were taken offsite to a thermal treatment facility.

In 1996, IRAs were completed to remove arsenic contaminated soils. Two excavations were completed to a depth of approximately 2 feet. Approximately 240 tons of soil were excavated. Once this action was complete, monitoring wells installed in the locations of the excavations indicated the presence of arsenic in the groundwater.

Via the Confirmation Sampling Program and data revealed during the IRAs and the RI/BRA, the contaminants of concern at the site were found to be as follows:

Contaminant(s) of Concern in Soils – Lead, Mercury and PAHs (benzo(a)pyrene).

Contaminant(s) of Concern in Groundwater – Trichlorethylene (TCE)

12.3 REMEDIAL ACTIONS

12.3.1 Remedy Selection

As per the ROD, the following remedies were selected:

Soils
Alternative OU26-4S Remove and Landfill
This alternative involved removal of contaminated soils for disposal in a solid waste (RCRA Subtitle D) landfill. The details, as per the ROD, were to:

- Remove the upper 1 foot of contaminated surface soils (estimated at 120 bank cubic yards).
- Backfill the excavations with uncontaminated fill followed by regrading and revegetation of the ground surface.
- Transportation and disposal of excavated soils at a local solid waste landfill.

Groundwater
Alternative OU26-3G Intrinsic Remediation of the Groundwater
This alternative includes monitoring for natural attenuation of the TCE plume and implementation of institutional controls. Natural attenuation involves all naturally occurring processes that reduce contaminant concentrations over time. These *in-situ* processes (intrinsic remediation) include biodegradation, abiotic transformation, dispersion, adsorption, and volatilization. The implementation details were:

- Long-term groundwater monitoring (for TCE and daughter products) to document, quantify, and confirm the natural attenuation processes indicated in the initial screening study and pilot study.
- Placing restrictions on current and future land and groundwater use in the contaminated area (e.g., restrict operation of base supply wells and future groundwater users).
- Long-term management and health and safety oversight by USAF personnel for any new construction projects in the contaminated area.
- Evaluation of the long-term monitoring to determine if natural attenuation is occurring as predicted. The evaluation will be part of the annual groundwater monitoring report.

12.3.2 Remedy Implementation

In June-July 1999, the OU26 ROD was implemented. Approximately 250 tons of contaminated soil/limestone (130 more tons than specified in the ROD) were removed and transported off site. The following is a description of soil removal activities at each excavation at the OU (Figure 25):

Excavation 1
- Analytical results from soil samples did not exceed the RGs for all compounds analyzed.
- Soil Removal and ROD actions are complete.

Excavation 2
- Exceedences were observed in sidewall and floor samples.
- The depth of the excavation was extended an additional 1 foot (2 feet total depth).
- The lateral extent of the excavation was not increased because of low concentrations of benzo(a)pyrene observed in two sidewall samples.
- An additional 55 tons of soil was removed and disposed from the excavation.
- Soil removal ROD actions are complete.

Excavation 3

- An exceedence was observed in one floor sample.
- The depth of the excavation was extended an additional 3 feet (4 feet total depth) in the southeast quadrant of the excavation.
- An additional 30 tons of soil was removed and disposed from the excavation.
- Soil removal ROD actions are complete.

During the week of 29 November 1999, in accordance with the ROD, the first quarterly groundwater samples were collected from existing monitoring wells at OU 26. The groundwater samples were analyzed for VOCs, and the following natural attenuation parameters: nitrite-nitrate nitrogen, sulfate, TOC, methane, ethane and ethene. The results of the sampling indicated exceedences of TCE, DCE and VC. Of the natural attenuation parameters sampled only methane, nitrate-nitrogen, sulfate and TOC were detected.

In May 2002, excavation of the effluent pipe, suspected of contributing to the contamination, was conducted (Figure 26). The discharge piping and surrounding soils were excavated and removed from the point at which the industrial waste line exists Building 745 to a point upgradient of monitoring well SM60-MW01. The pipe was composed of vitrified clay segments that were connected together with water tight gasket seals. Approximately 50 feet of the discharge piping was removed. The depth of the discharge pipeline ranged from between 3 and 5 feet below land surface (bls). The excavation was approximately 1.5 feet wide and extended 25 feet north from Building 745 beginning approximately 10 feet from the edge of the building. The excavation was then extended east (at the elbow) an additional 25 feet. The depth of the trench ranged from 5 feet deep to 8.5 feet deep. The discharge pipe was grouted shut where it disconnected from the building drain system. The trench was then backfilled with clean gravel and a biomass amendment. The biomass amendment was comprised of plant mulch and was intended to enhance the natural attenuation process at the site by adding a source of organic carbon and lowering dissolved oxygen concentrations in the shallow aquifer.

12.3.3 System Operations/Operation and Maintenance

Groundwater monitoring wells will be maintained for sampling for at least five years, and if sampling is to continue, for up to 30 years. Well maintenance includes aboveground inspection and painting well covers, so that the wells can be easily identified in the field. Locks will be replaced, if necessary, to secure the monitoring wells from unauthorized entry. If filter pack and screens become plugged by sediment or biological growth, they will be cleaned in accordance with accepted methods prior to sampling events.

12.4 FIVE-YEAR REVIEW PROCESS

12.4.1 Document Review

This five-year review consisted of a review of relevant documents, including the ROD implementation report and monitoring reports.

12.4.2 Data Review

Groundwater Monitoring

As per the ROD, groundwater monitoring has been conducted quarterly since November 1999 (Figure 27). A summary of the most recent groundwater sampling event (July 2002) follows:

One or more chlorinated aliphatic hydrocarbons (CAH) were detected in each of the shallow monitoring wells sampled with the exception of B745-MW01 and OU26-MW09. TCE was detected at concentrations at or above the GCTL of 3 µg/L in samples collected from monitoring wells SM60-MW01, OU26-MW03, OU26-IMW01, OU26-IMW03, and OU26-IMW04. The detected concentrations ranged from 3.26 µg/L to 163 µg/L. Cis-1,2-

DCE was also detected above GCTL (70 µg/L) in OU26-IMW03 at 169 µg/L. No other CAHs were detected above their respective GCTLs. Analytical results are summarized in Table 6.

Two lines of evidence were used to determine the contribution of natural attenuation to groundwater restoration. The first line of evidence documented the loss of contaminant mass over time. Specific observations with regard to the first line of evidence are:

- When compared to April 2002 data, the July 2002 concentrations of TCE have decreased in two of the five impacted wells (SM60-MW01 and OU26-MW04) and increased slightly in three wells (OU26-IMW01, OU26-Mw03, and OU26-IMW03).
- The presence of cis-1,2-DCE as the dominant DCE isomer in all wells with detectable concentrations of DCE suggests the occurrence of reductive dechlorination.

The second lie of evidence involved changes in groundwater geochemistry that are directly correlated with biological activity. The pertinent observations supporting the occurrence of natural attenuation are:

- Detected concentrations of total organic carbon in impacted wells are below the levels necessary to support reductive dechlorination.
- Dissolved oxygen levels in three of the five impacted wells exceed 0.5mg/L suggesting that during July 2002 oxygen levels were high enough in the aquifer to inhibit the occurrence of reductive dechlorination.
- The pH of the aquifer is within the optimal range for microbial activity.
- The observation of methane production in half of the wells sampled is indicative of reducing conditions that are favorable for the degradation of chlorinated solvents.

Evidence supports the conclusion that reductive dechlorination is occurring at the site, although the rate is limited by the lack of organic carbon and by relatively high dissolved oxygen levels measured in July 2002. Seasonal, historic, measured dissolved oxygen levels are generally within the ideal range for reductive dechlorination suggesting the July 2002 data are somewhat of an outlier. The reduction in contaminant concentrations in two of the impacted wells and relatively stable concentrations in another over time supports this conclusion. The high cis-1,2-DCE to total DCE ratios also indicate the occurrence of reductive dechlorination.

By removing the industrial waste discharge line exiting from the northwest side of Building 745 and surrounding contaminated soil, a source of groundwater contamination has been eliminated. The addition of a biomass amendment to the material used to backfill the excavation should enhance natural attenuation processes at the site by adding a source of organic carbon and lowering dissolved oxygen concentrations in the shallow aquifer.

12.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 26 area. Several of the monitoring wells were found without locking caps and this situation was remedied. No other unusual observations were documented during this visit.

12.5 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

The remedy is functioning as intended by the decision documents. Evidence supports the conclusion that reductive dechlorination is occurring at the site, although the rate is limited by the lack of organic carbon and by relatively high dissolved oxygen levels measured in July 2002. Seasonal, historic, measured dissolved oxygen levels are generally within the ideal range for reductive dechlorination suggesting the July 2002 data are somewhat of an outlier. The reduction in contaminant concentrations in two of the impacted wells and relatively

stable concentrations in another over time supports this conclusion. The high cis-1,2-DCE to total DCE ratios also indicate the occurrence of reductive dechlorination.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection are still valid.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

12.6 ISSUES

There are no issues at this site.

12.7 *RECOMMENDATIONS AND FOLLOW-UP ACTIONS*

The continuation of the groundwater monitoring program is recommended for this OU, until such time as the regulatory agencies require further remedial action or agree that monitoring is no longer needed.

12.8 PROTECTIVENESS STATEMENT

The remedy at OU 26 is expected to be protective upon completion and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

12.9 NEXT REVIEW

The next five-year review for OU 26 is required by December 2007, five years from the date of this review.

13.0 OPERABLE UNIT 28

13.1 HISTORY OF CONTAMINATION

The Propulsion (Engine) Maintenance Facility, Building 750, occupies approximately 4 acres located in the southwestern portion of the Base (Figure 28). An OWS and sump were located in the southwest portion of the site. Four USTs associated with electroplating operations at the facility were located at the northwest corner of the building, near Bikini Boulevard. Building 744, an AST, and Building 743, an emergency generation building, are located to the south of the site. The site had been used for jet engine teardown, rebuilding, inspection and repair since approximately 1950. In the past, waste oils were collected in a mobile, 500-gallon capacity aboveground storage tank that was approximately 75 percent full and was located on the asphalt drive at the southeast of the building during the 1993 visual inspection.

Removal of the OWS and its associated sump was conducted between December 1993 and February 1994. At this time the floor drains in the building and on the concrete pad were grouted. A two-phase subsurface investigation was completed at the sump/separator area in March-May 1994 and November 1994. Sampling indicated the presence of toluene, total recoverable petroleum hydrocarbons (TRPH), and benzene. Groundwater samples indicated the presence of PCE, TCE, Naphthalene, 1-Methlynapthalene, 2-Methlynapthalene, Arsenic, Chromium, and Lead.

Removal of the USTs was conducted in March 1994. There was no visible evidence of leakage from the USTs to the surrounding site media. Soil samples taken from the excavation indicated no exceedences. Four monitoring wells were subsequently installed. Samples of the groundwater indicated no exceedences.

A list of important OU 28 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Visual Inspection	1993
OWS Removal	1993-1994
UST Removal	1994
RI/BRA	1997
Final ROD	1998
ROD Implementation	1999
Final ROD Implementation Report	2000

13.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

A RI was conducted at OU 28 in 1997. Surface soil samples collected during the RI indicated relatively low concentrations of BTEX compounds. PAHs and SVOCs were also detected. Pesticides were also detected in the surface soils. Lead and arsenic were detected in elevated concentrations in surface soil surrounding Building 744.

Subsurface samples collected from the borings near the OWS and sump excavations indicated that relatively low concentrations of BTEX and PAHs are present in the subsurface. Low concentrations of one SVOC and pesticides were detected in one subsurface sample. Seven metals were reported above background concentrations in the subsurface samples.

Groundwater sampling from monitoring wells installed for the OWS investigation indicated that low concentrations of PCE and TCE were present at concentrations of concern. Further investigation during the RI via Geoprobe indicated that these concentrations were very localized and most at or below action levels. Thus, the groundwater was found to pose no risk.

13.3 REMEDIAL ACTIONS

13.3.1 Remedy Selection

Per the ROD, Alternative OU28-4 Remove and Landfill was chosen as the appropriate remedial action for this site. The alternative involves removal of contaminated soils for disposal in a solid waste (RCRA Subtitle D) landfill and would be implemented by:

- Removal of the upper 2 feet of contaminated surface soils (estimated at about 1,500 bank cubic yards). Removal would be done by using appropriately sized, conventional earthmoving equipment.

- Backfilling the excavations with uncontaminated fill followed by regarding and revegetation of the ground surface.

- Encapsulation/stabilization of any excavated soils determined to be characteristically hazardous based on toxicity characteristic leaching procedure (TCLP) testing. To be conservative, it was assumed that about 460 bank cubic yards of soil containing lead around the tank at OU28 are characteristically hazardous; however, only one out of four analytical tests for total lead indicated a level that could potentially exceed the TCLP standard for lead. Encapsulation/stabilization would be done using pozzolonic of proprietary agents, and treatability testing would be needed to design the mix. Following successful stabilization, the soils would be transported to a local solid waste landfill for disposal.

- Transportation and disposal of excavated soils at a local solid waste (RCRA Subtitle D) landfill.

13.3.2 Remedy Implementation

The remedial actions and associated field activities for OU 28 were conducted between May 1999 and September 1999. Approximately 1,450 tons of contaminated soil/limestone (50 tons less than specified in the ROD) were removed and disposed during the implementation of the ROD. The following is a summary of the excavation activities at the site (Figure 29):

Excavation 1
- Exceedences were observed in floor samples (lead, arsenic and benzo(a)pyrene)
- The excavation was 2 feet deep, which is below the direct exposure pathway
- ROD actions are complete

Excavation 2
- Exceedences were observed in sidewall and floor samples (dibenzo(a,h)anthracene and benzo(a)pyrene)
- The excavation was 2 feet deep, which is below the direct exposure pathway
- Because the excavation is bordered by asphalt on all sides, additional excavation work was not completed since the paved surfaces act as a cap to prevent rainwater from infiltrating to the soil and prevent direct exposure to contaminated soil
- ROD actions are complete

Excavation 3
- Exceedences were observed in sidewall and floor samples (benzo(a)pyrene)

- The excavation was 2 feet deep, which is below the direct exposure pathway
- The east sidewall of the excavation was extended an additional 5 feet to an asphalt layer (1 foot bls) which will act as a cap to prevent rainwater from infiltrating to the soil and prevent direct exposure to contaminated soil
- An additional 10 tons of soil was removed and disposed from the excavation
- ROD actions are complete

Excavation 4
- Exceedences were observed in sidewall samples (dibenzo(a,h)anthracene and benzo(a)pyrene)
- Because the excavation is bordered by asphalt on all sides, additional excavation work was not completed since the paved surfaces act as a cap to prevent rainwater from infiltrating to the soil and prevent direct exposure to contaminated soil
- ROD actions are complete

Excavation 5
- Exceedences were observed in floor samples (benzo(a)pyrene, benzo(a)anthracene, and dibenzo(a)anthracene)
- The excavation was 2 feet deep, which is below the direct exposure pathway
- ROD actions are complete

13.3.3 System Operations/Operation and Maintenance

Not applicable.

13.4 FIVE-YEAR REVIEW PROCESS

13.4.1 Document Review

This five-year review consisted of a review of relevant documents, including the ROD implementation report and monitoring reports.

13.4.2 Data Review

Not applicable.

13.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 28 area. No unusual observations were documented during this visit.

13.5 TECHNICAL ASSESSMENT

Not applicable.

13.6 ISSUES

None.

13.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Based upon a letter from the FDEP (dated December 13, 2000), "No additional excavation work is warranted at the OU. The proposal to address exceedences of PAHs in soil via deed transfer documents is acceptable." No further actions at this site are required.

13.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the ROD have been met at OU 28 and found to be protective of human health and the environment.

13.9 NEXT REVIEW

As there will be LUC/ICs at the site, the next five-year review for OU 28 is required by December 2007, five years from the date of this review.

14.0 OPERABLE UNIT 29

14.1 HISTORY OF CONTAMINATION

Building 760 was located at the northeast intersection of Bikini and St. Nazaire Boulevards. Based on available records, Building 760 was used as an Avionics Aerospace Ground Equipment Shop, a Tactical Electronic Warfare System Shop and housed various associated testing shops. The building was demolished sometime prior to 1993 after being heavily damaged by Hurricane Andrew. The site currently consists of a mixture of asphalt or concrete paved areas and a grassy area covering the former building footprint (Figure 30).

An OWS had been located at the southeast corner of the former Building 760. The OWS consisted of a concrete structure with associated underground influent and effluent piping. The OWS was constructed of reinforced concrete. Effluent from the OWS discharged to the north into the sanitary sewer that runs along Bikini Boulevard. Influent to the OWS was believed to have originated inside the former Building 760.

A 2,000-gallon steel UST was also located adjacent to the southwest side of former Building 760. The tank was reportedly used to store diesel fuel to power a generator or boiler that was located inside Building 760.

A list of important OU 29 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Visual Inspection	1993
OWS Removal	1994
UST Removal	1994
RI/BRA	1997
Final ROD	1998
ROD Implementation	1999
Final ROD Implementation Report	2000

14.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

The OWS was removed in March 1994 and the influent and effluent piping were sealed at the excavation boundaries. Soils were excavated to a depth of about 6.5 feet and were transported off-site for treatment and disposal. TRPH and PAHs were detected in soil borings at this location. Groundwater sampling did not detect any exceedences over target levels. During groundwater investigative actions conducted in 1994 and 1996, TCE and PCE were detected in the localized area around the former OWS.

In January 1994 the 2,000-gallon UST was removed. There was no evidence of petroleum stained soils or visible LNAPL on the groundwater in the excavation; however, a slight sheen was noted on the water surface in the excavation. Screening of the excavations sidewalls for organic vapors indicated potentially elevated concentrations of petroleum hydrocarbons in the northwest portion of the excavation. Subsequent soil borings indicated the presence of TRPH and lead. Samples from installed monitoring wells indicated the presence of chlorobenzene, 1,4-dichlorobenzene, benzene, and naphthalenes.

Based on the finding from the removal actions, a RI/BRA was conducted. Chemicals of Potential Concern, as determined in the RI, are as follows:

Surface Soil – SVOCs, Pesticides/PCBs, and Metals

Subsurface Soils – VOCs, SVOCs, Pesticides/PCBs and Metals

Groundwater – VOCs (1,2-dichloroethene, TCE, and vinyl chloride)

Further investigation during the RI via Geoprobe indicated that these concentrations were very localized and most at or below action levels. Thus, the groundwater was found to pose no risk.

14.3 REMEDIAL ACTIONS

14.3.1 Remedy Selection

Per the ROD, Alternative OU29-4 – Remove and Landfill was selected as the appropriate remedial action for this site. The alternative involves removal of contaminated soils for disposal in a solid waste (RCRA Subtitle D) landfill. The alternative would be implemented by:

- Removal of the upper 2 feet of contaminated surface soils (estimated at about 920 bank cubic yards). Removal would be done using appropriately sized, conventional earthmoving equipment.
- Backfilling the excavations with uncontaminated fill followed by regrading and revegetation of the ground surface.
- Transportation and disposal of excavated soils at a local solid waste (RCRA Subtitle D) landfill.

14.3.2 Remedy Implementation

The remedial actions and associated field activities for OU 29 were conducted between May 1999 and September 1999. Approximately 1,350 tons of contaminated soil/limestone (400 more tons than specified in the ROD) were removed and disposed of during the implementation of the ROD. The following is a summary of the excavation activities at the site (Figure 31):

Excavation 1
- Exceedences were observed in sidewall and floor samples (PAHs)
- On portions of the excavation bordered by asphalt, additional excavation work was not completed since the paved surfaces act as a cap to prevent rainwater from infiltrating to the soil and prevent direct exposure to contaminated soil
- The excavation was 2 feet deep, which is below the direct exposure pathway
- The areal extent of the excavation was increased 10 feet north and 5 feet east
- Analytical results from soil samples from additional excavations did not exceed the RGs for all compounds analyzed
- An additional 85 tons of soil was removed and disposed from the excavation
- ROD actions are complete

Excavation 2
- Exceedences were observed in sidewall and floor samples (benzo(a)pyrene)
- The excavation was 2 feet deep, which is below the direct exposure pathway
- The areal extent of the excavation was increased 5 feet southeast
- Because of the low concentration of benzo(a)pyrene observed in one sidewall sample from the additional excavation, the lateral extent of the excavation was not increased
- An additional 40 tons of soil was removed and disposed from the excavation
- ROD actions are complete

Excavation 3

- Exceedences were observed in one sidewall and one floor sample (benzo(a)pyrene)
- The excavation was 2 feet deep, which is below the direct exposure pathway
- Because of the low concentrations of benzo(a)pyrene observed in one sidewall sample, the lateral extent of the excavation was not increased
- ROD actions are complete

Excavation 4

- Exceedences were observed in sidewall samples (benzo(a)pyrene)
- The areal extent of the excavation was increased 5 feet northeast and southwest
- Analytical results from soil samples from the additional excavations did not exceed the RGs for all compounds analyzed
- An additional 35 tons of soil were removed and disposed from the excavation
- ROD actions are complete

14.3.3 Svstem Operations/Operation and Maintenance

Not applicable.

14.4 FIVE-YEAR REVIEW PROCESS

14.4.1 Document Review

This five-year review consisted of a review of relevant documents, including the ROD implementation report.

14.4.2 Data Review

Not applicable.

14.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 29 area. No unusual observations were documented during this visit.

14.5 TECHNICAL ASSESSMENT

Not applicable.

14.6 ISSUES

None.

14.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Based upon a letter from the FDEP (dated December 13, 2000), "No additional excavation work is warranted at the OU. The proposal to address exceedences of PAHs in soil via deed transfer documents is acceptable." No further actions at this site are required.

14.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the *intent* and goals of the ROD have been met at OU 29 and found to be protective of human health and the environment.

14.9 NEXT REVIEW

As there will be LUC/ICs at the site, the next five-year review for OU 29 is required by December 2007, five years from the date of this review.

15.0 OPERABLE UNIT 30

15.1 HISTORY OF CONTAMINATION

OU 30, which includes the New Contractor Storage Area Parking Lot, occupies an area of approximately 1.5 acres located in the east portion of the Base (Figure 32). The 315-foot by 135-foot asphalt parking area was being used by private demolition and debris hauling contractors for storage at the time of the Confirmation Sampling in 1994. Steel 55 gallon drums containing fuel oil and hydraulic fluid, ASTs, construction machinery, mobile fuel tanks, scrap metal, and other miscellaneous debris were observed in the parking lot during the June 1993 Visual Inspection. During the 1996 SI activities, the parking lot was being used by another Base contractor for a decontamination water treatment facility. Several large, lined, aboveground holding tanks and an air stripping tower were observed to be present at the site. The entire parking area is bordered by grass and drains to the northeast and southwest towards the drainage swales. Building 767, which was located 50 feet south of the lot has been removed. Building 769 is located 50 feet northwest of the parking lot.

The salvaged debris and one AST that were located on the west half of the parking area have been removed. The AST formerly located at the southwest corner appeared to have been leaking. Another AST (approximately 2,000-gallon capacity) that may have contained diesel fuel was located along the east edge of the lot at the time of the 1993 Visual Inspection, but was removed before the beginning of the Confirmation Sampling Program (1994). It was surrounded by a coarse limestone berm approximately 1 foot high. During the 1993 Visual Inspection, dead vegetation and black, stained soils were observed in the southwest and northwest corners of the lot, and dead vegetation was also observed on the east side of the parking lot.

A list of important OU 30 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Preliminary Assessment/Site Investigation	1996-1997
RI/BRA	1998
FS	1999
Draft Final ROD	1999
Interim Remedial Actions in Support of Proposed ROD	February-July 2001
Interim Remedial Actions in Support of Proposed ROD Report	December 2001
Biennial Groundwater Sampling	April 2003

15.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

Preliminary investigations at OU 30 were completed as part of the Confirmation Sampling Program as well as the Base UST/OWS Remediation Program. As a result of these investigations an expanded SI was completed in February 1996. Sampling analysis indicated the presence of PAHs, dibenzofuran, low level VOCs and seven metals above background in surface soils. Arsenic was detected in subsurface soil samples and groundwater samples.

In October 1994, UST 769-1 was excavated and removed. The UST was located immediately northeast of Building 769 next to an unnumbered building. Field screening concentrations for soils were reported to be below 10ppm; however, petroleum product globules were noted on the groundwater surface in the UST excavation. A temporary monitoring well was installed after the excavation was backfilled. Sampling did not indicate any exceedences. An AST was subsequently installed in the same location.

A 750-gallon diesel fuel UST was also located along the northern edge of the site. It was removed in January 1994. Field screening for soil vapors indicated that all concentrations were below 10ppm. No petroleum sheen or product was observed on the groundwater surface in the excavation. The product distribution lines were capped at the excavation boundary and the excavation was backfilled with clean fill material. A monitoring well was installed and sampled. No analytes were reported above their respective PQLs.

Results of the expanded site investigation indicated that PAHs and arsenic were present in the surface and subsurface soils on the site. Arsenic was also present in the groundwater samples. Based on these findings, it was recommended that a RI be conducted at OU 30.

The RI/BRA found that arsenic in the groundwater posed an unacceptable risk to human health. It was also determined that arsenic and some individual PAHs exceeded the respective FDEP risk-based industrial soil cleanup goals. Thus, the OU was recommended for a FS.

Based on the results and conclusions of the FS and Proposed Plan, a ROD was submitted to the regulatory agencies in 1999. Due to Land Use and memorandum of agreement (MOA) discussions, the ROD remains unsigned.

15.3 REMEDIAL ACTIONS

15.3.1 Remedy Selection

As per the unsigned ROD, dated October 1999, the remedial alternatives selected for the OU are as follows:

Soil

Alternative OU30-4S – Remove and Landfill

This alternative involves removal of contaminated soils for disposal in a solid waste (RCRA Subtitle D) landfill. This alternative would be implemented by:

- Removal of the upper 0.5 feet to 4.5 feet of impacted surface soils (estimated at about 2,400 bank cubic yards [bcy]). Removal would be done using appropriately sized, conventional earthmoving equipment.
- Backfilling the excavations with uncontaminated fill followed by regrading and revegetation of the ground surface.
- Transportation and disposal of excavated soils at a local solid waste (RCRA Subtitle D) landfill. The total estimated weight is about 3,400 tons.

Groundwater

Alternative OU30-2G – Groundwater Monitoring and Evaluation of In-Situ Remedial Technologies

This alternative includes groundwater monitoring of the arsenic plume and implementation of institutional controls and an evaluation of in-situ groundwater treatment technologies. This includes:

- Long-term groundwater monitoring of arsenic concentrations to document and quantify the concentrations of arsenic and associated risk to human health and the environment.
- Initial over-development and resampling of the site monitoring wells with arsenic concentrations above the federal and state MCLs of 50 µg/L.
- Placing restrictions on current and future land and groundwater use in the contaminated area (e.g., restrict operation of Base supply wells and future groundwater users). Specific language regarding land use restrictions will be incorporated in the FOST and approved by FDEP as a third-party beneficiary.
- In accordance with Air Force policy, implementation of a remedial action will require the submission of a health and safety plan that conforms to 29 CFR 1910.120.
- Completion of a pilot study to evaluate the effectiveness of the in-situ adsorption alternative. The USAF has committed to the smaller-scale pilot study to allow for the potential unrestricted reuses of OUs 20/21, 30 and 31.

The in-situ adsorption alternative would be implemented by:

- Installing five vertical injection wells, one at each "hotspot", designed to operate at injection rates between 29 and 40 gpm.
- Connecting each injection well to an injection line that runs to a trailer-mounted mixing plant. The mixing plant would be designed for a total injection rate of up to 40 gpm of potable water containing 29 mg/L of ferric chloride. This concentration of ferric chloride will precipitate iron oxide in-situ and thereby facilitate adsorption of arsenic. The mixing plant would consist of a storage tank (with hose or piping to the nearest fire hydrant), a mixing tank and mixer, a chemical metering pump to feed ferric chloride, a ferric chloride storage tank, and injection pump.

15.3.2 Remedy Implementation

Beginning February 2001, a voluntary IRA was implemented and followed the selected remedy in the Draft ROD OU 20/21, OU 30 and OU 31 (June 1999), despite the fact that the ROD had not been signed. Approximately 2,800 tons of contaminated soil/limestone (600 tons less than specified in the draft ROD) were removed and disposed of during implementation of the voluntary IRA. The following is a summary of activities and results for OU 30 (Figures 33, 34, and 35):

Excavation 1:

- Exceedances of arsenic were observed in sidewall and floor samples
- The excavation is bordered by asphalt on all sides, therefore additional excavation work at most of the site was not completed since the paved surface acts as a cap to prevent rainwater from infiltrating to the soil as well as prevent direct exposure to contaminated soil
- The excavation was 2 feet deep, which is below the direct exposure pathway
- Soil removal actions are complete

Excavation 2:

- Exceedences of arsenic and PAHs were observed in sidewall and floor samples
- Additional excavation activities removed remaining contaminated soil from sidewalls that were not bordered by asphalt
- Seven floor samples exceeding RGs for one or more PAH compounds were not excavated due to the hardness of the limestone at that location
- Soil removal actions are complete

Excavation 3:

- Exceedences of arsenic and PAHs were observed in sidewall and floor samples
- Additional excavation activities removed remaining contaminated soil from sidewalls that were not bordered by asphalt
- The floor of the excavation in one "hot spot" was extended to 1.5 feet below original grade reducing PAH compounds and arsenic to less than RGs
- Soil removal actions are complete

Excavation 4:

- Exceedences of arsenic and PAHs were observed in sidewall and floor samples

- Additional excavation activities (Phases II, III and IV) removed remaining contaminated soil from sidewalls that were not bordered by asphalt with the exception of OU30-4-SS1B (3.4 mg/kg, B(a)P) and OU30-4-3A (10.6 mg/kg, As)
- Soil removal actions are complete

Pilot Study

Following completion of the voluntary IRA, an Evaluation of In-Situ Remedial Technologies was completed at OU 30. The contaminant of concern is arsenic. The evaluation involved completion of Bench Scale and Pilot Test studies to evaluate the effectiveness of an in-situ adsorption technology using ferric chloride.

Prior to pilot study implementation, bench scale testing was completed on a representative groundwater sample to evaluate the effectiveness of ferric chloride versus ferric sulfate solutions for in-situ arsenic adsorption. The bench scale testing indicated that the groundwater at the site was acceptable for the proposed treatment.

Installation of the pilot test injection and monitoring point clusters was completed during the week of July 16, 2001. Monitoring wells MW-2 and MW-6 as well as monitoring point clusters MP-1 and MP-2 were sampled and analyzed for arsenic and iron. MW-2 and MW-6 exceeded FDEP GCTLs for arsenic (Figure 37). However, analytical results from the monitoring point clusters did not detect arsenic above GCTLs. This suggests the occurrence of arsenic may be more localized to the vicinity of the monitoring wells than originally thought.

A thorough search for suppliers of ferric chloride (FeCl) solution was completed. However, the search revealed that the available raw material contained trace metals (arsenic, copper, lead, and molybdenum) that exceeded FDEP GCTLs. The fact that no trace metal-free raw ferric chloride could be found caused the Air Force to reconsider the pilot study and ultimately decide not to continue.

15.3.3 System Operations/Operation and Maintenance

Also as part of this voluntary IRA, groundwater sampling was conducted. Seven groundwater samples were collected from OU 30 groundwater monitoring wells (Figure 36). All samples were analyzed for arsenic, iron and alkalinity. Arsenic was detected in monitoring well AOC1-MW-0002 (0.204 mg/L) and MW-0006 (0.278 mg/L) above GCTL. Iron was not detected in excess of the secondary drinking water standard. Arsenic concentrations demonstrated a slight decrease in monitoring well AOC1-MW-0002 and a slight increase in MW-0006. However, concentrations remained relatively unchanged from the previous sampling event (March 2001). Groundwater overpumping was not conducted at this site due to poor results at OUs 20/21 and 31. Analytical results are provided in Table 7.

15.4 FIVE-YEAR REVIEW PROCESS

15.4.1 Document Review

This five-year review consisted of a review of relevant documents, including the ROD implementation report and monitoring reports.

15.4.2 Data Review

Not applicable.

15.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 30 area. No unusual observations were documented during this visit.

15.5 TECHNICAL ASSESSMENT

Not applicable.

15.6 ISSUES

None.

15.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

A conference call was held on February 24, 2003 with FDEP, USEPA and DERM to discuss OU 20/21, 30 and 31. It was agreed that OU 30 would be subject to groundwater use restrictions and No Further Action with land use controls for soil. A ROD is forthcoming. Biennial groundwater sampling will begin April 2003.

15.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the proposed ROD have been met at OU 30 and found to be protective of human health and the environment.

15.9 NEXT REVIEW

The next five-year review for OU 30 is required by December 2007, five years from the date of this review.

16.0 OPERABLE UNIT 31

16.1 HISTORY OF CONTAMINATION

OU 31, which includes the Nondestructive Inspection Lab (Building 755), is located at the southern end of St. Nazaire Street near the main runway (Figure 38). The building originally contained a garage, X-ray room and dark room, offices, furnace room, and a mechanical room. During the 1993 Visual Inspection, a fill cap labeled "Fuel Oil" was located in the pavement south of the building. A concrete pad located northwest of the building may have been used to contain electrical equipment. Two areas of stressed vegetation were observed along the northeast boundary of the site.

A list of important OU 31 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Preliminary Assessment/Site Investigation	1996-1997
RI/BRA	1998
FS	1999
Draft Final ROD (unsigned)	1999
Interim Remedial Actions in Support of Proposed ROD	February-July 2001
Interim Remedial Actions in Support of Proposed ROD Report	December 2001
Biennial Groundwater Sampling	April 2003

16.2 INITIAL RESPONSE AND BASIS FOR TAKING ACTION

Preliminary investigations were completed at OU 31 as part of the Confirmation Sampling Program and Base OWS/UST Remediation Program. Compounds detected in soil samples were PAHs and arsenic. Groundwater analysis indicated no contaminants of concern.

In 1994 a UST located at the southeast corner of Building 755 was removed. Subsequently four monitoring wells were installed and sampled. Soil and groundwater analysis did not indicate any contaminants of concern.

In March 1996 an Interim Removal Action was completed west of Building 755 at the location of a former concrete transformer pad. High levels of arsenic had been detected at this location during the Confirmation Sampling Program. An area of approximately 37 feet by 27 feet by 3.25 feet deep was excavated. Soil samples were collected from the excavation sidewalls to determine when acceptable arsenic concentrations had been reached. The east wall of the excavation was not excavated to acceptable arsenic concentrations due to power line obstructions in the area. A groundwater sample collected from a monitoring well placed in the center of the excavation area indicated arsenic concentrations of 310 µg/L, exceeding the federal and FDEP guidance concentration of 50 µg/L.

An expanded SI was conducted in 1996. PAHs and arsenic were detected in surface and subsurface soils. Arsenic was also detected in the groundwater. Based on these findings, the site was recommended for a RI.

The RI/BRA for OU 31 was completed in 1998. As a result of this evaluation, it was determined that PAHs and arsenic found in surface and subsurface soils and arsenic found in the groundwater posed unacceptable risks to human health. Thus, the OU was recommended for a FS.

Based on the results and conclusions of the FS and Proposed Plan, a ROD was submitted to the regulatory agencies in 1999. Due to Land Use and MOA discussions, the ROD remains unsigned.

16.3 REMEDIAL ACTIONS

16.3.1 Remedy Selection

As per the unsigned ROD, dated October 1999, the remedial alternatives selected for the OU are as follows:

Soil

Alternative OU31-4S – Remove and Landfill

This alternative involves removal of contaminated soils for disposal in a solid waste (RCRA Subtitle D) landfill. The alternative would be implemented by:

- Removal of the upper 0.5 to 1 foot of impacted surface soil (estimated at about 270 bcy). Removal would be done using appropriately sized, conventional earthmoving equipment.
- Backfilling the excavation with uncontaminated fill followed by regrading and revegetation of the ground surface.
- Transportation and treatment of excavated soils at a local low temperature thermal desorption incinerator, and subsequent beneficial reuse of the by-products in pavement materials. The total estimated weight is about 370 tons.

Groundwater

Alternative OU31-2G - Groundwater Monitoring

This alternative includes groundwater monitoring of the arsenic plume and implementation of institutional controls. The groundwater monitoring alternative includes:

- Long-term groundwater monitoring of arsenic concentrations to document and quantify the concentrations of arsenic and associated risk to human health and the environment.
- Initial over-development and sampling of all site monitoring wells with arsenic concentrations above federal and state MCLs of 50 µg/L.
- Placing restrictions on current and future land and groundwater use in the contaminated area (e.g., restrict operation of Base supply wells and future groundwater users). Specific language regarding land use restrictions will be incorporated in the FOST and approved by FDEP as a third-party beneficiary.
- In accordance with Air Force policy, implementation of a remedial action will require submission of a health and safety plan that conforms to 29 CFR 1910.120.

16.3.2 Remedy Implementation

Beginning February 2001, a voluntary IRA was implemented and followed the selected remedy in the Draft ROD for OU 20/21, OU 30 and OU 31 (June 1999), despite the fact that the ROD has remained unsigned. Approximately 450 tons of contaminated soil/limestone (70 more tons than the excavations specified in the draft ROD) were removed and disposed of during implementation of the voluntary IRA. The following is a summary of activities and results for OU 31 (Figures 39 and 40):

Excavation 1:

- Exceedences of PAH compounds were observed in sidewall and floor samples
- Additional excavation activities removed remaining contaminated soil from the floor of the excavation and sidewalls that were not bordered by asphalt
- Analytical results from soil samples from the additional excavations did not exceed the RGs for all compounds analyzed
- Soil removal actions are complete

Excavation 2:

- Exceedences of arsenic were observed in sidewall and floor samples
- The depth of the excavation was extended 1.5 feet deep in areas where floor samples exceeded RG
- The areal extent of the excavation was increased 5 feet on the north, east, and south sides
- Analytical results from soil samples from additional excavations did not exceed the RGs for arsenic
- A statistical evaluation showed the 95th UCL of the mean arsenic concentration decreased 88 percent (from 30.8 to 3.8 mg/kg) as a result of the removal action. This is below the base specific SCTL of 10 mg/kg
- Soil removal actions are complete

Also as part of this voluntary IRA, groundwater sampling and monitoring well overpumping was conducted. The results of the baseline monitoring revealed that two monitoring wells had arsenic concentrations above GCTL prior to the soil removal actions.

Based on these results, overpumping of these two wells was performed. Approximately 15,000 gallons of groundwater were pumped from each well. Subsequent sampling of the monitoring wells revealed that arsenic concentrations decreased (from 155 µg/L to 52.9 µg/L in B755-MW0001; and from 98 µg/L to 43.2 µg/L in OU31-MW0003).

16.3.3 System Operations/Operation and Maintenance

Also as part of this voluntary IRA, groundwater sampling was conducted after the overpumping activities. Two groundwater samples were collected from OU 31 groundwater monitoring wells (Figure 41). All samples were analyzed for arsenic, iron, and alkalinity. Arsenic was not detected at a concentration that exceeded the GCTL of 0.05 mg/L in either of the monitoring wells. Iron was detected at a concentration in excess of the secondary drinking water standard. Analytical results are provided in Table 8.

16.4 FIVE-YEAR REVIEW PROCESS

16.4.1 Document Review

This five-year review consisted of a review of relevant documents, including the Interim Remedial Actions in Support of Proposed ROD report.

16.4.2 Data Review

Not applicable.

16.4.3 Site Inspection

AFRPA conducted a site visit as part of this five-year review process. The site visit consisted of a visual inspection of the OU 31 area. No unusual observations were documented during this visit.

16.5 TECHNICAL ASSESSMENT

Not applicable.

16.6 ISSUES

None.

16.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

A conference call was held on February 24, 2003 with FDEP, USEPA and DERM to discuss OU 20/21, 30 and 31. It was agreed that OU 31 would be subject to groundwater use restrictions and granted a No Further Action for soils. A ROD for this site is forthcoming. Biennial groundwater sampling will begin April 2003.

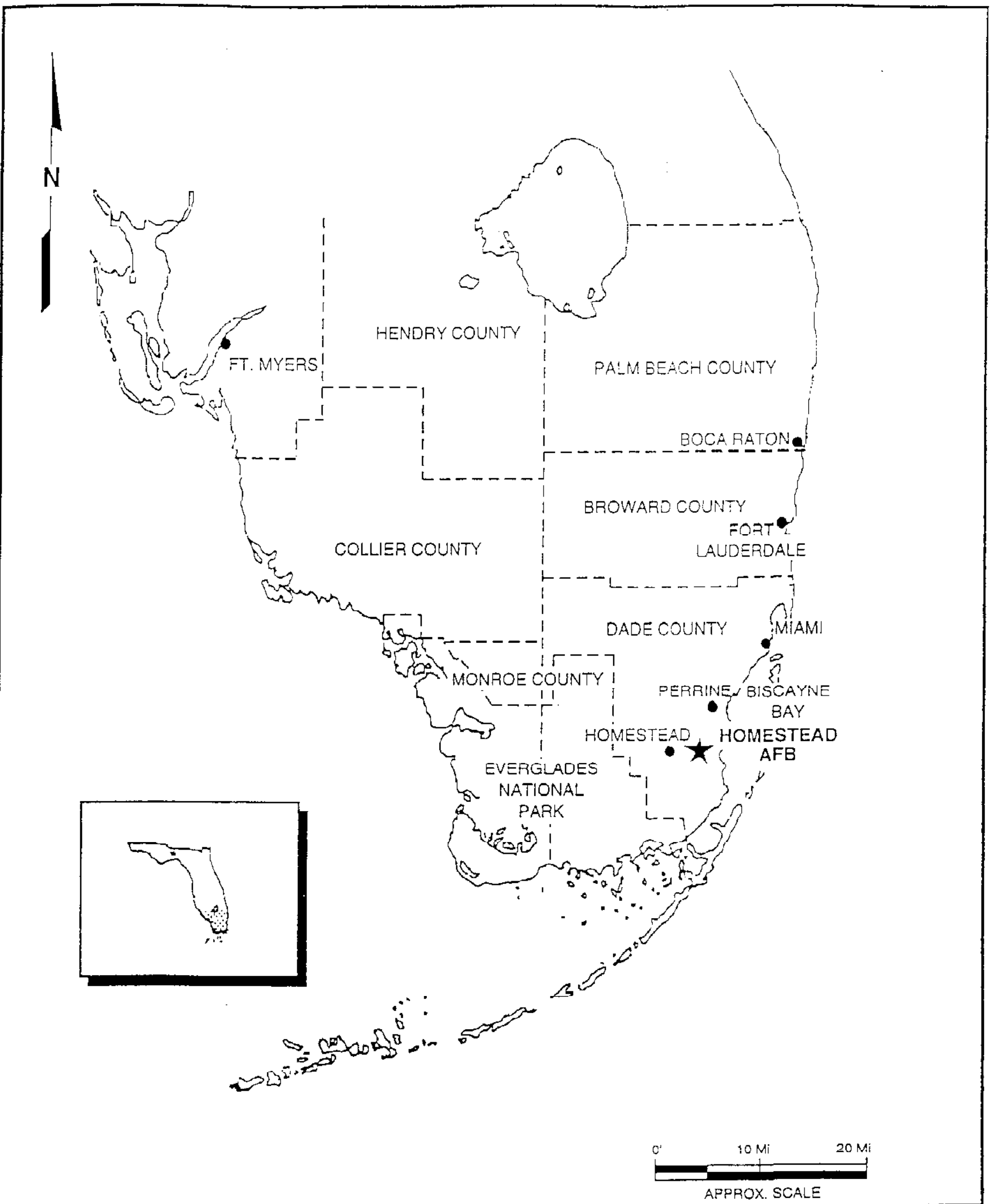
16.8 PROTECTIVENESS STATEMENT

Based on the completed activities, the intent and goals of the proposed ROD have been met at OU 31 and found to be protective of human health and the environment.

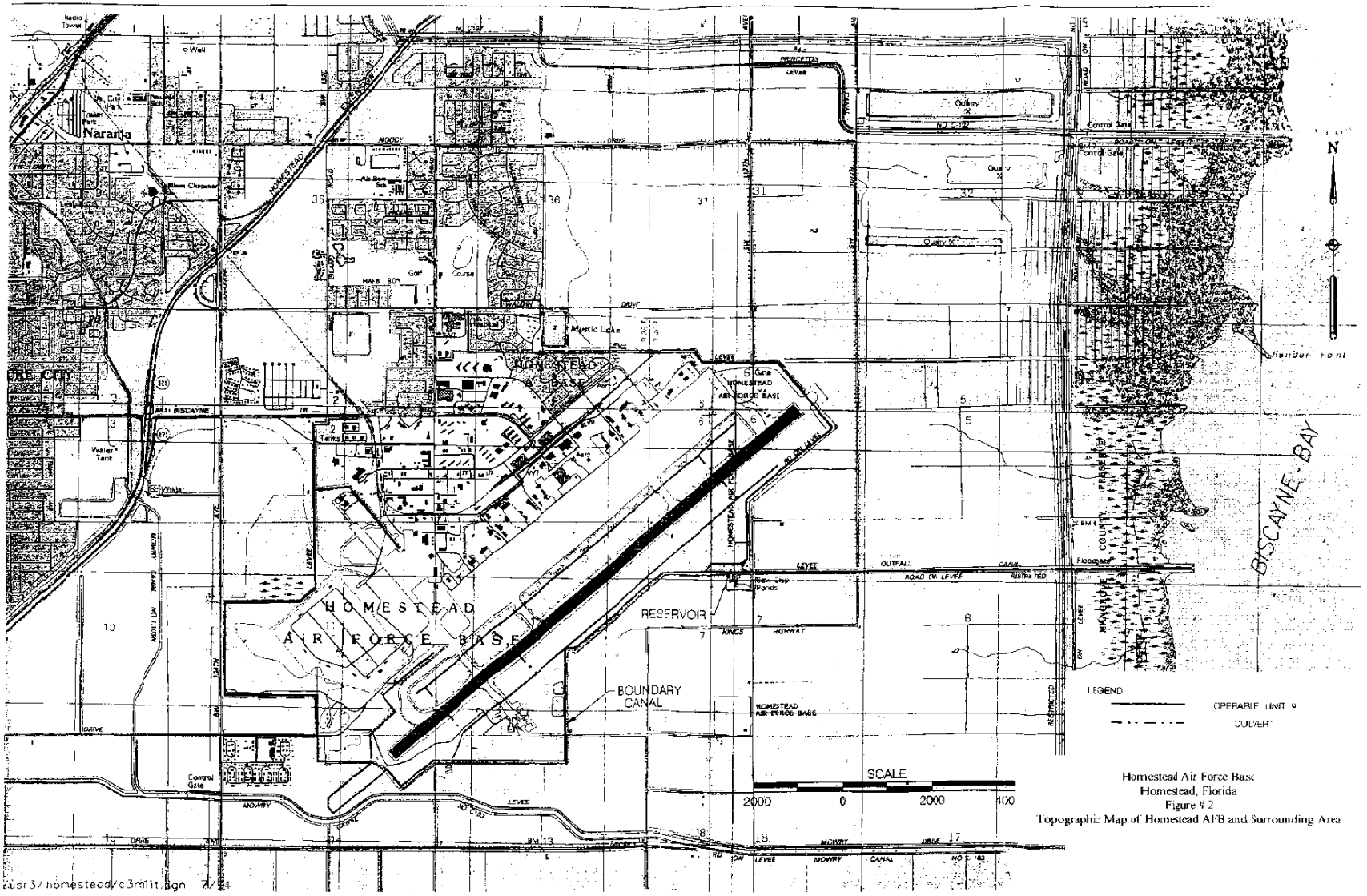
16.9 NEXT REVIEW

The next five-year review for OU 31 is required by December 2007, five years from the date of this review.

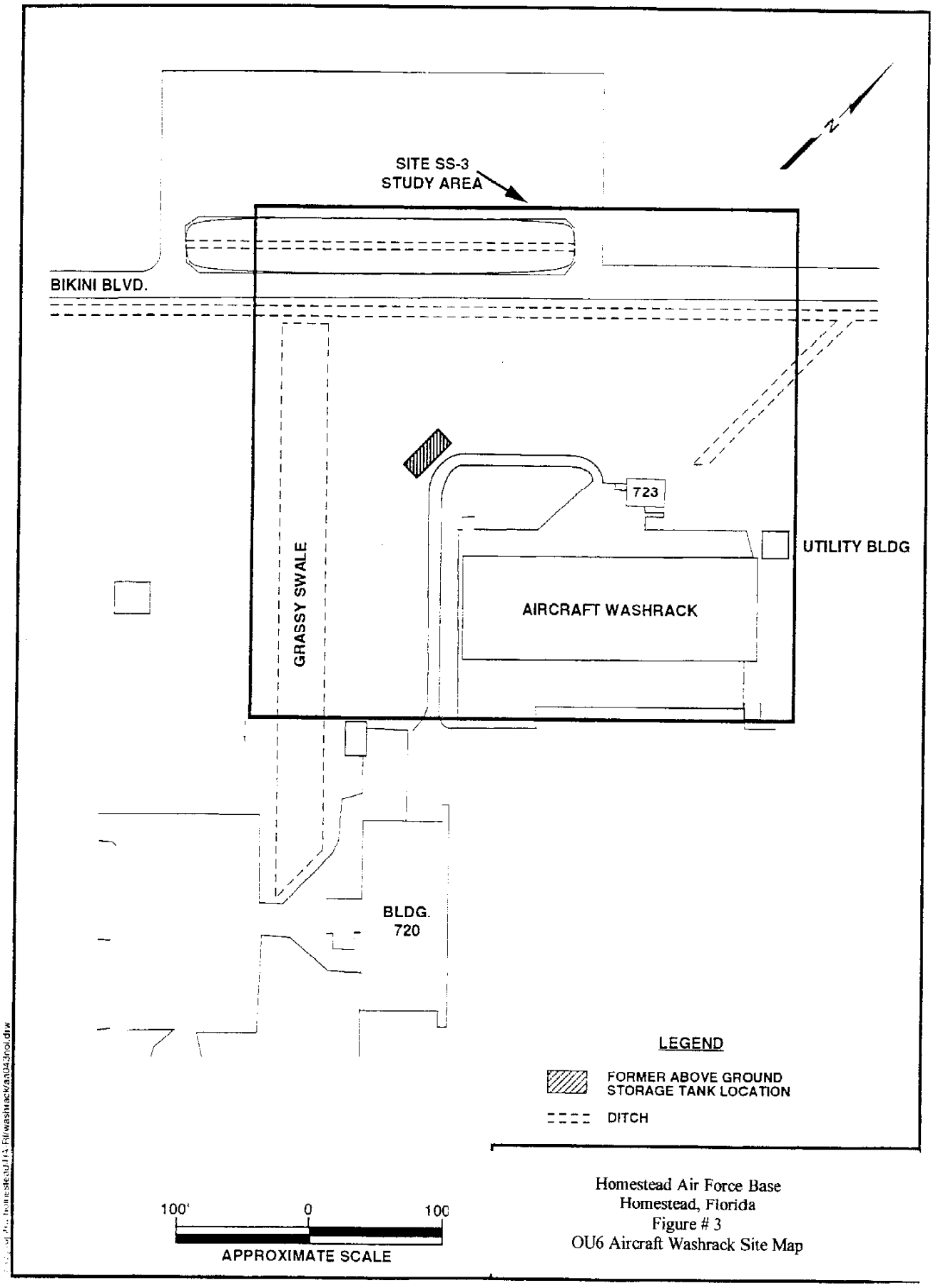
FIGURES



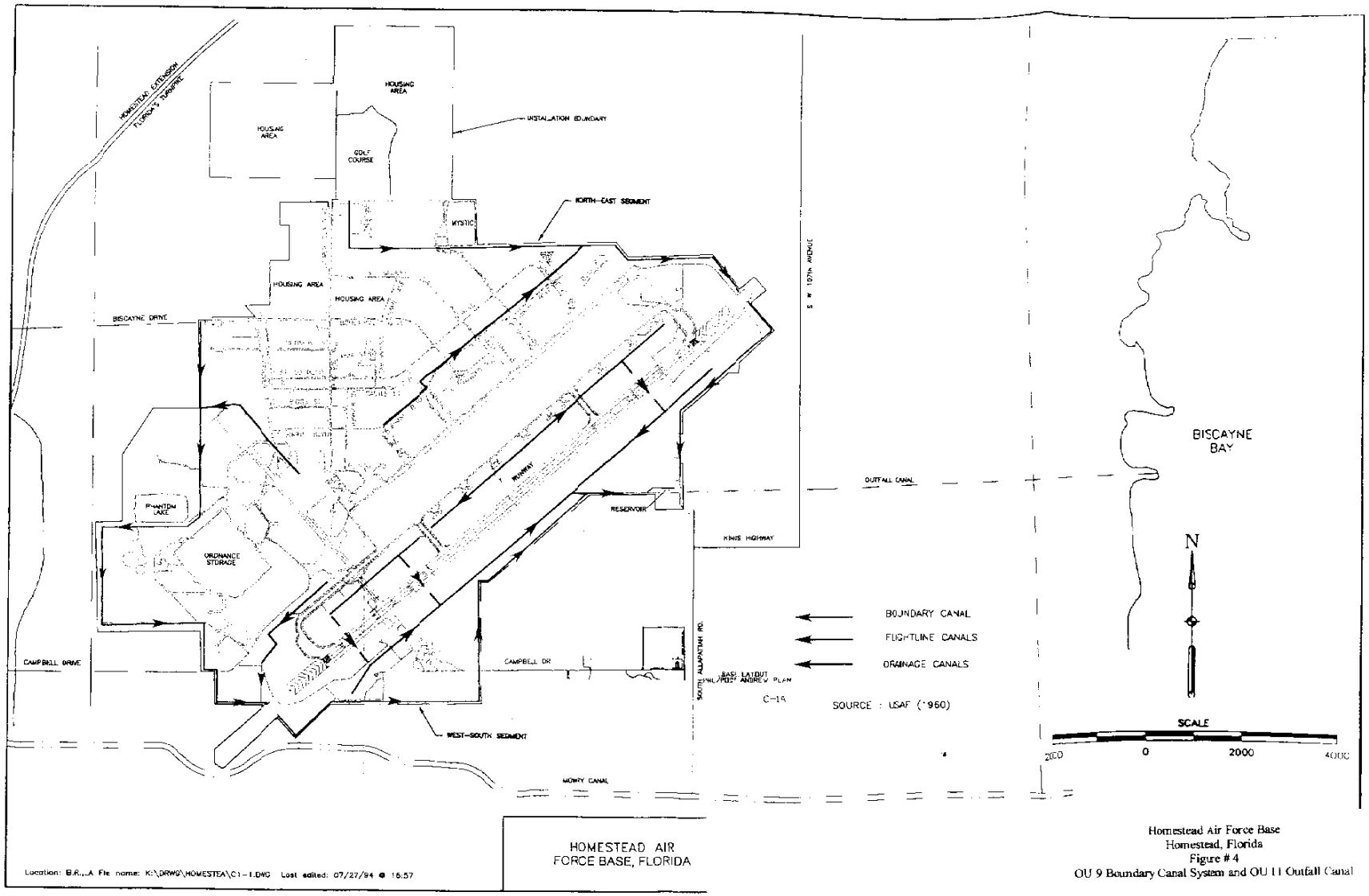
Homestead Air Force Base
Homestead, Florida
Figure #1
Location of Homestead Air Force Base



Homestead Air Force Base
Homestead, Florida
Figure # 2
Topographic Map of Homestead AFB and Surrounding Area



Homestead Air Force Base
Homestead, Florida
Figure # 3
OU6 Aircraft Washrack Site Map



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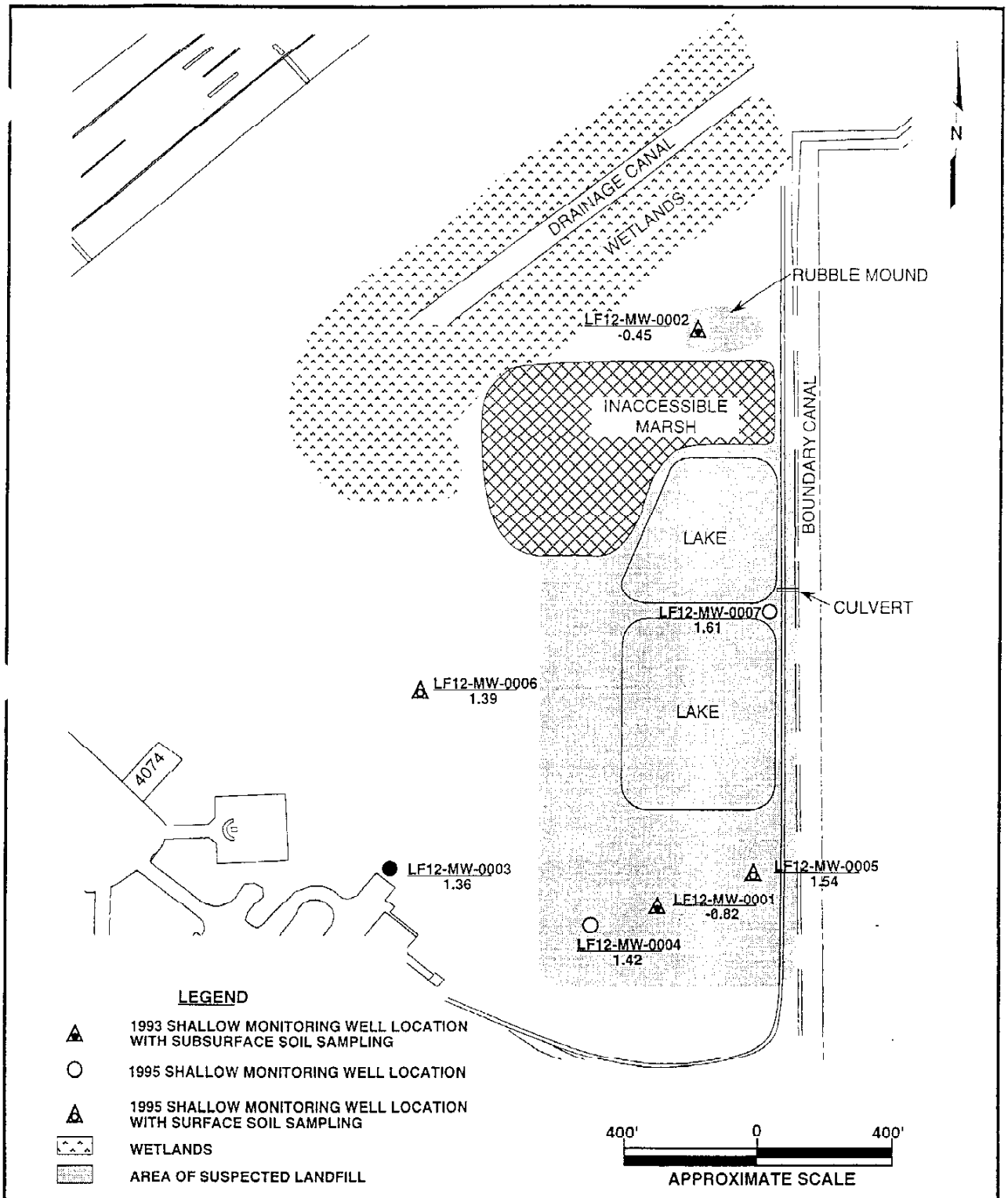
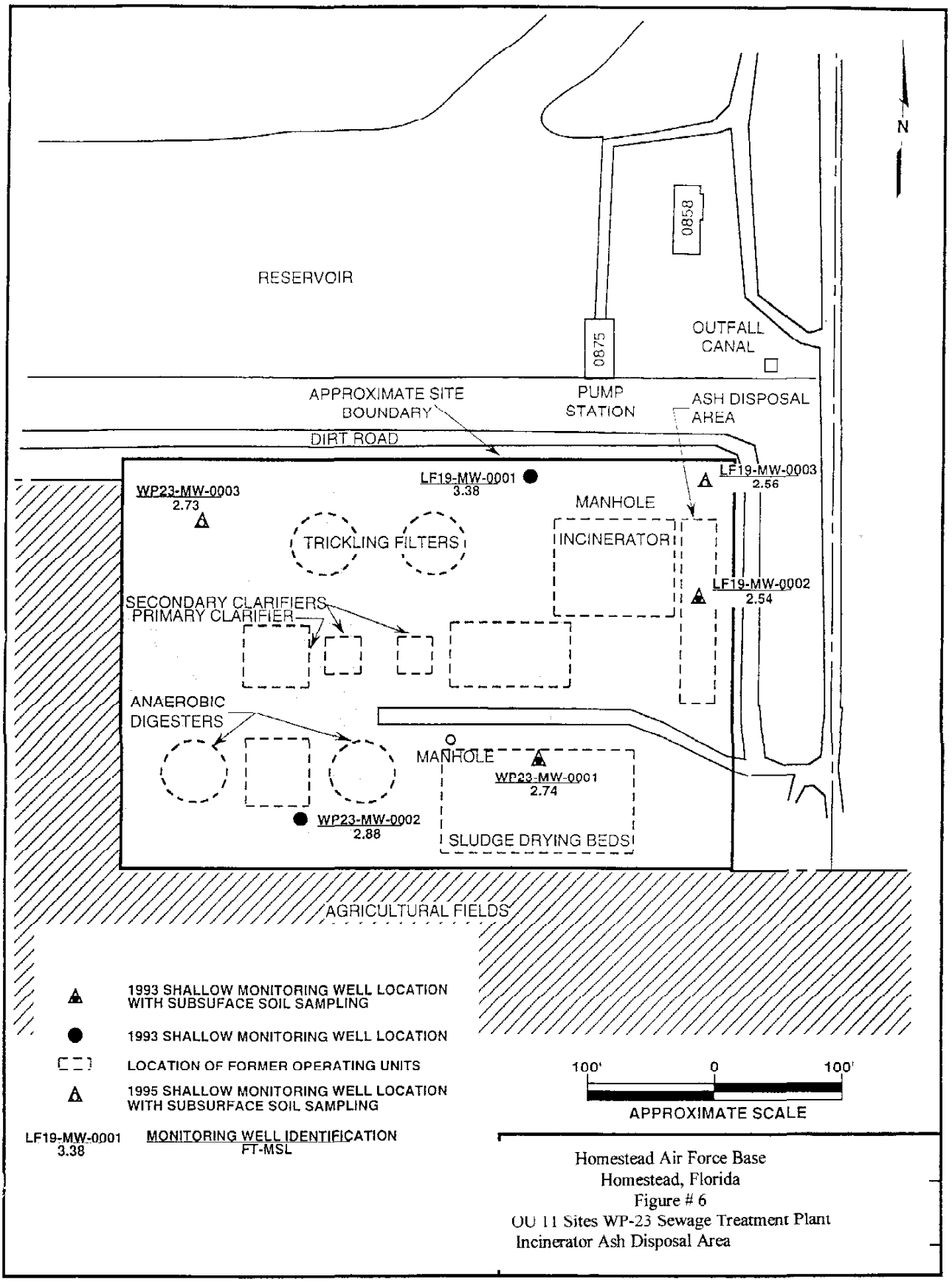
Homestead Air Force Base
Homestead, Florida
Figure # 4
OU 9 Boundary Canal System and OU 11 Outfall Canal



Homestead Air Force Base
Homestead, Florida
Figure # 5
OU-10 Landfill Area Site Map



Homestead Air Force Base
Homestead, Florida
Figure # 6
OU 11 Sites WP-23 Sewage Treatment Plant
Incinerator Ash Disposal Area

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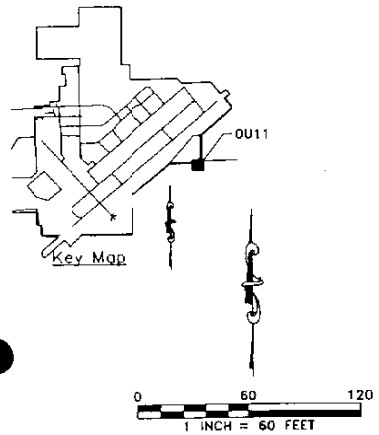
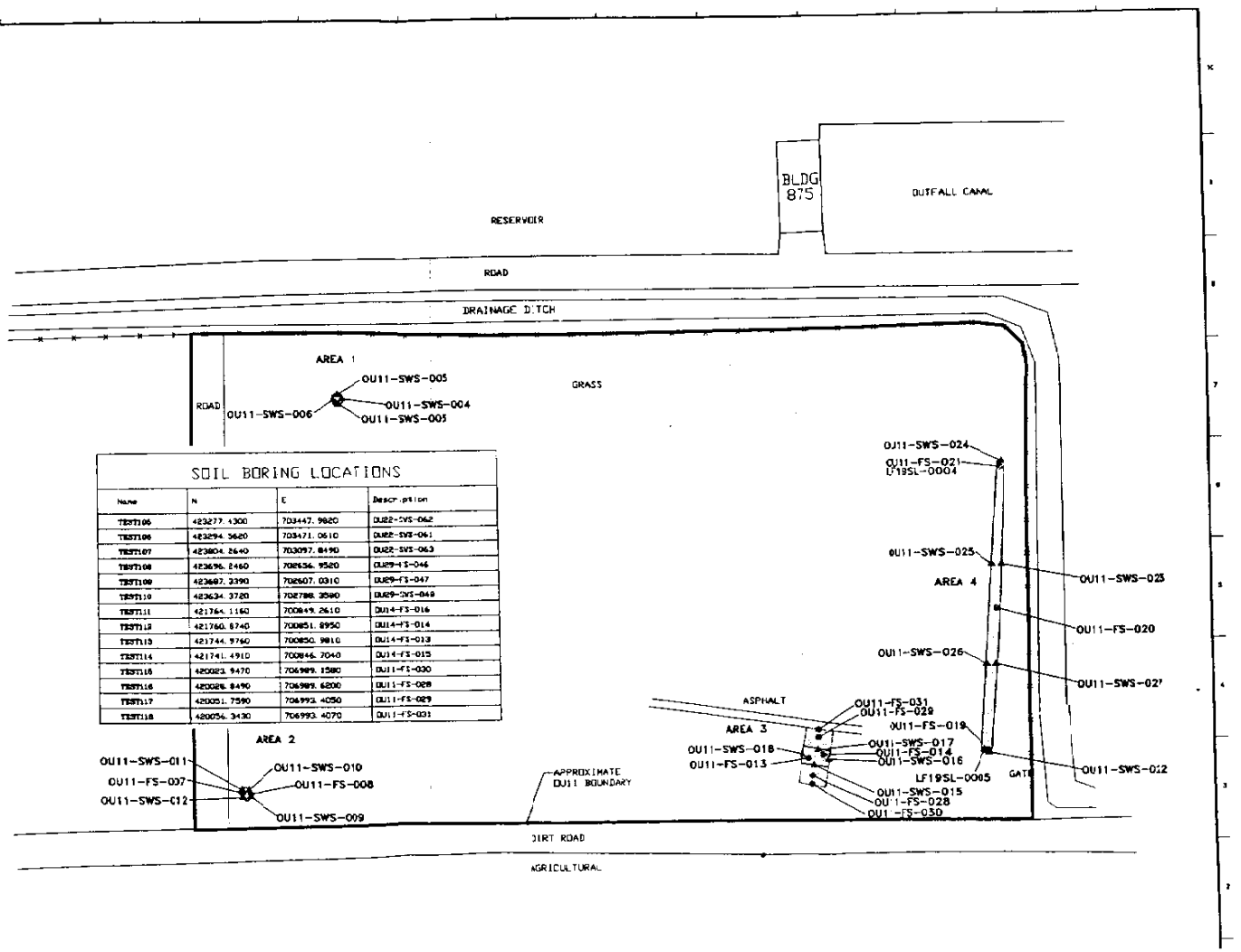




SOIL BORING LOCATIONS

Name	N	E	Description
TEST105	423277.4300	703447.9820	OU22-SWS-062
TEST106	423294.3620	703471.0610	OU22-SWS-061
TEST107	423804.2640	703097.8490	OU22-SWS-063
TEST108	423696.2460	708536.9520	OU29-FS-046
TEST109	423687.2390	708507.0310	OU29-FS-047
TEST110	423634.3720	708788.2590	OU29-SWS-048
TEST111	421764.1160	700849.2610	OU14-FS-016
TEST112	421760.8740	700851.8950	OU14-FS-014
TEST113	421744.9760	700850.9810	OU14-FS-013
TEST114	421741.4910	700846.7040	OU14-FS-015
TEST115	420023.9470	706989.1580	OU11-FS-030
TEST116	420026.8490	706989.6200	OU11-FS-028
TEST117	420051.7590	706993.4050	OU11-FS-029
TEST118	420056.3430	706993.4070	OU11-FS-031

LEGEND

LF19-SL-004	RI SOIL BORING
LF19-SL-005	RI SOIL BORING
-x-x-	FENCE
	PHASE III EXCAVATION
	EXCAVATION AREA

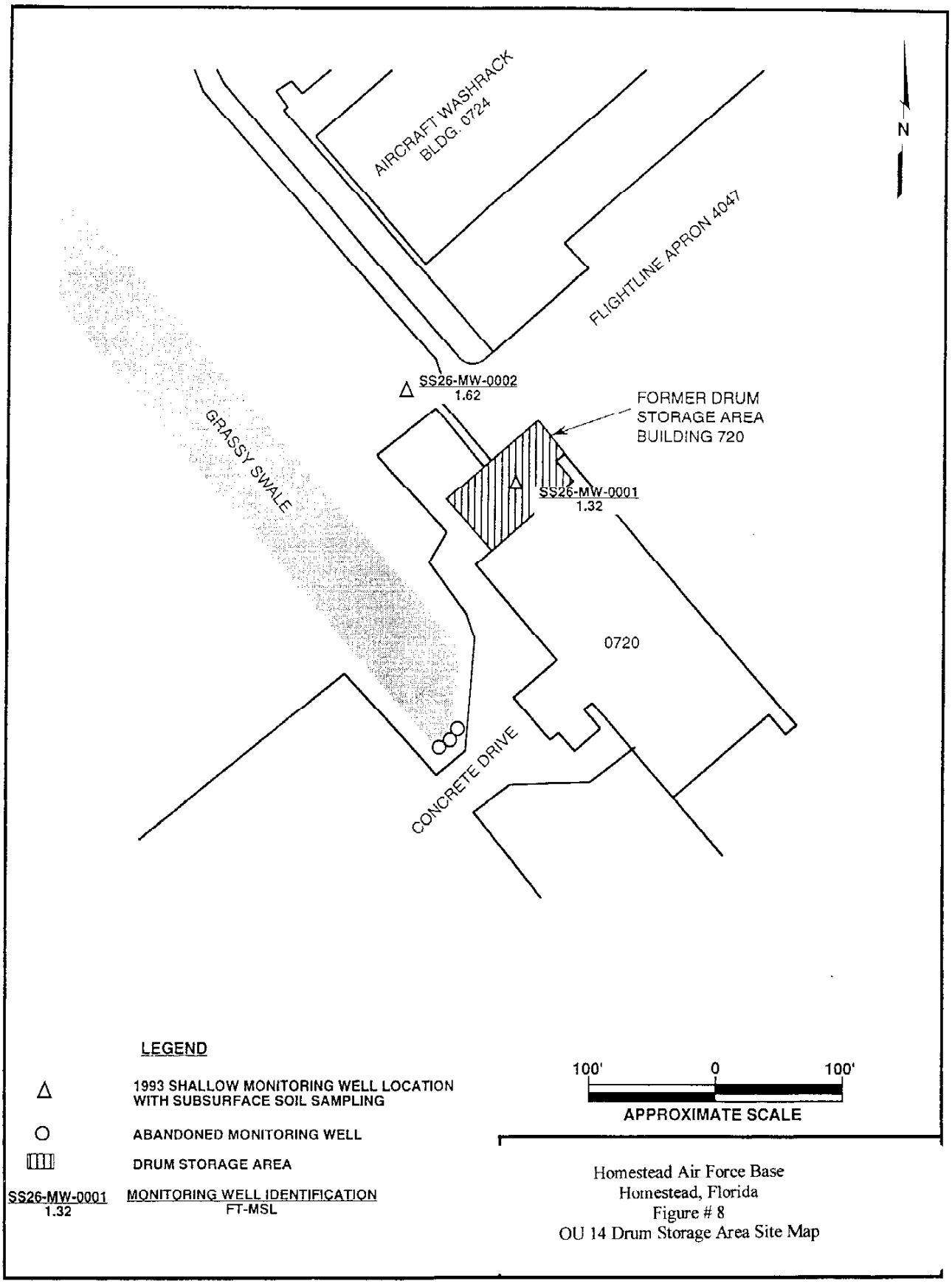
the group

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.
		ADDED IN SOIL BORING LOCATIONS	LS	4/2/98	

AT FULL SCALE
CADD FILE:
DRAWN: L. SKULMAN
DESIGNED:

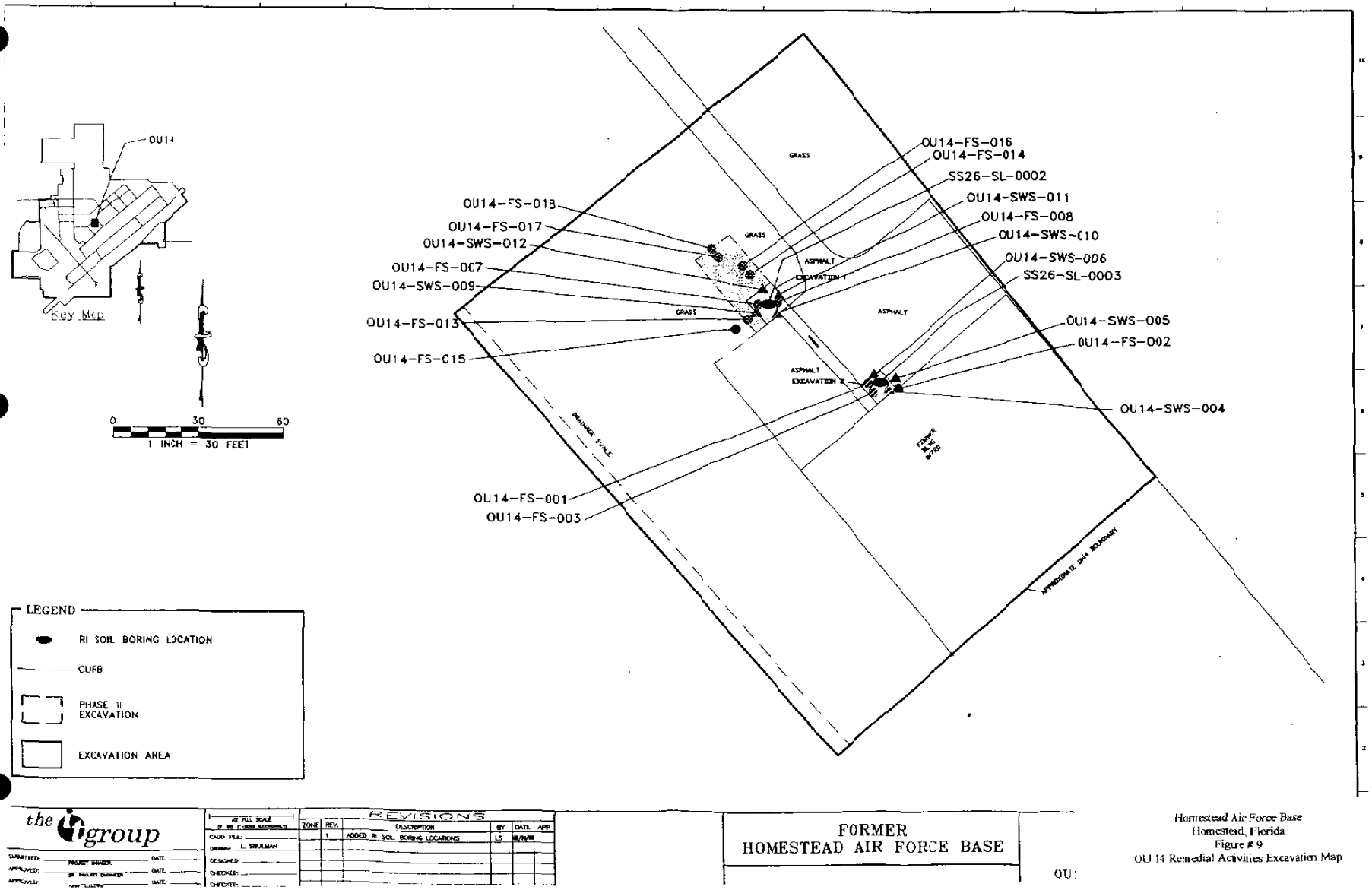
FORMER
HOMESTEAD AIR FORCE BASE

Homestead Air Force Base
Homestead, Florida
Figure # 7
OU 11 Sites WP-23 and LF-19 Remedial Activities
Excavation Map



Homestead Air Force Base
Homestead, Florida
Figure # 8
OU 14 Drum Storage Area Site Map

mac/proj/ftw/ho... ad/pre/eb63hol.drw



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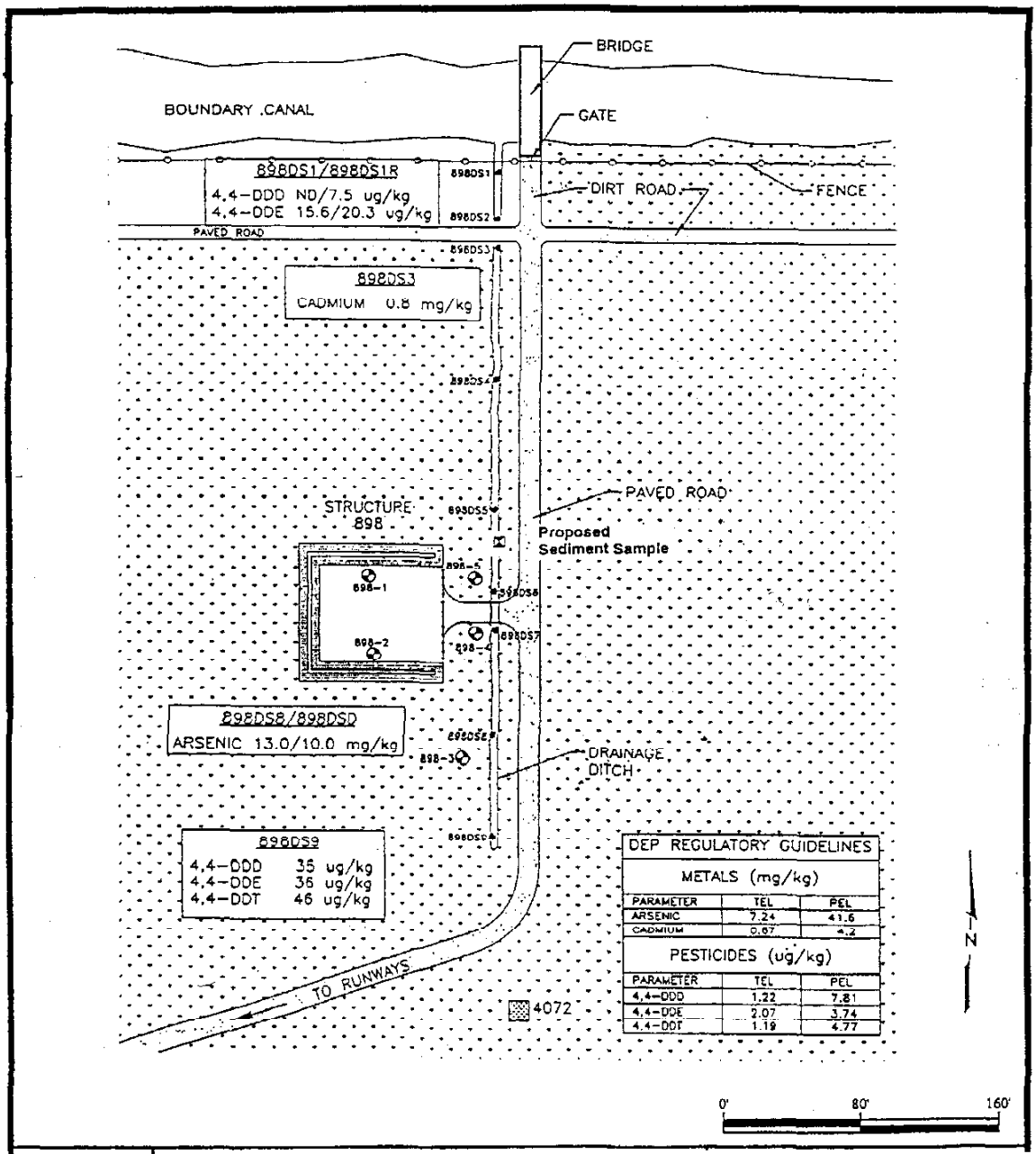
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP
	1	ADDED RI SOIL BORING LOCATIONS	LS	10/31/96	

FORMER
HOMESTEAD AIR FORCE BASE

OU

Homestead Air Force Base
Homestead, Florida
Figure # 9
OU 14 Remedial Activities Excavation Map

OU-16 Structure 898, Former Hawk Missile Area

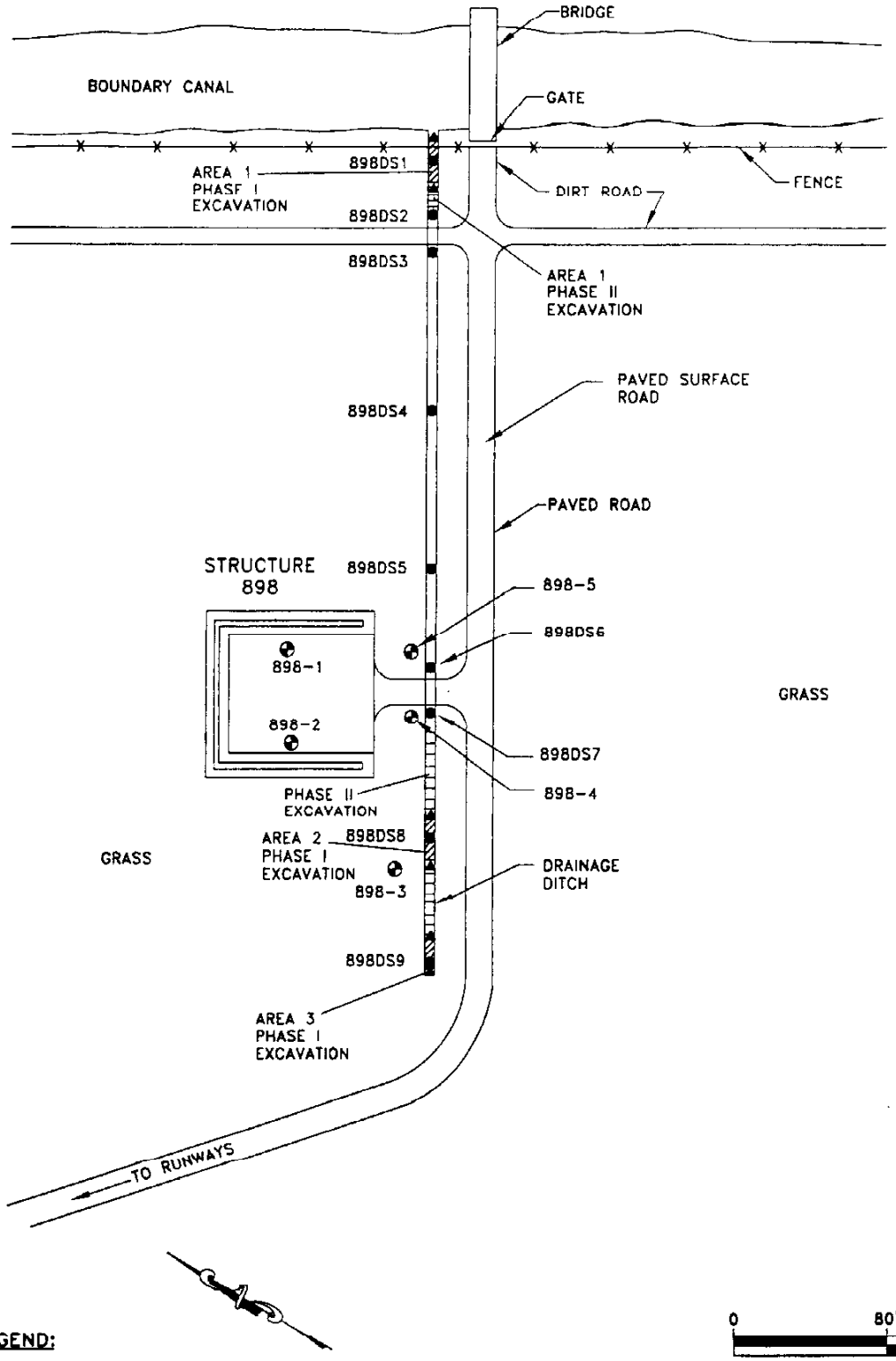


OHM Remediation Services Corp.

LEGEND

- Grassy Areas
- Monitoring Well & Subsurface Sample
- Proposed Sediment Sample Location
- Sediment Sample Location
- TEL - Toxic Effect Limit
- PEL - Probable Effect Limit

Homestead Air Force Base
Homestead, Florida
Figure # 10
OU 16 Structure 898, Former hawk Missile Site Map



LEGEND:

- GRASSY AREAS
- MONITORING WELL & SUBSURFACE SAMPLE
- FORMER SEDIMENT SAMPLE LOCATION
- CONFIRMATION SEDIMENT SAMPLE LOCATION
- PHASE I SEDIMENT REMOVAL AREA
- PHASE II SEDIMENT REMOVAL AREA

the

DRAWN BY	
CHECKED BY	
APPROVED BY	

REV.	SHEET #	PROJECT NO.
0	1	920685

Homestead Air Force Base
Homestead, Florida
Figure # 11
OU-16 Remedial Activities Excavation Map

FORMER
HOMESTEAD AIR FORCE BASE
MIAMI-DADE COUNTY, FLORIDA

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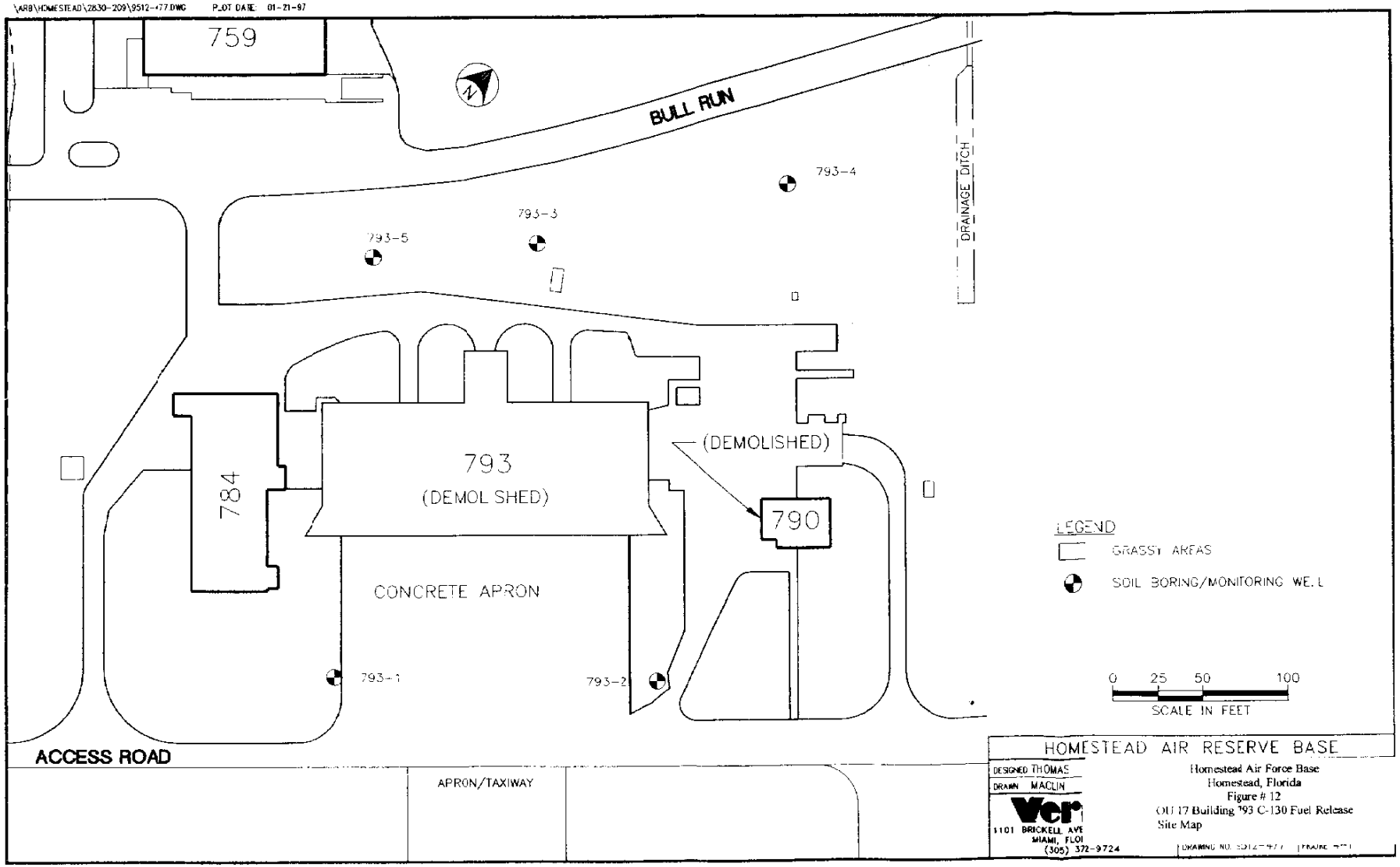
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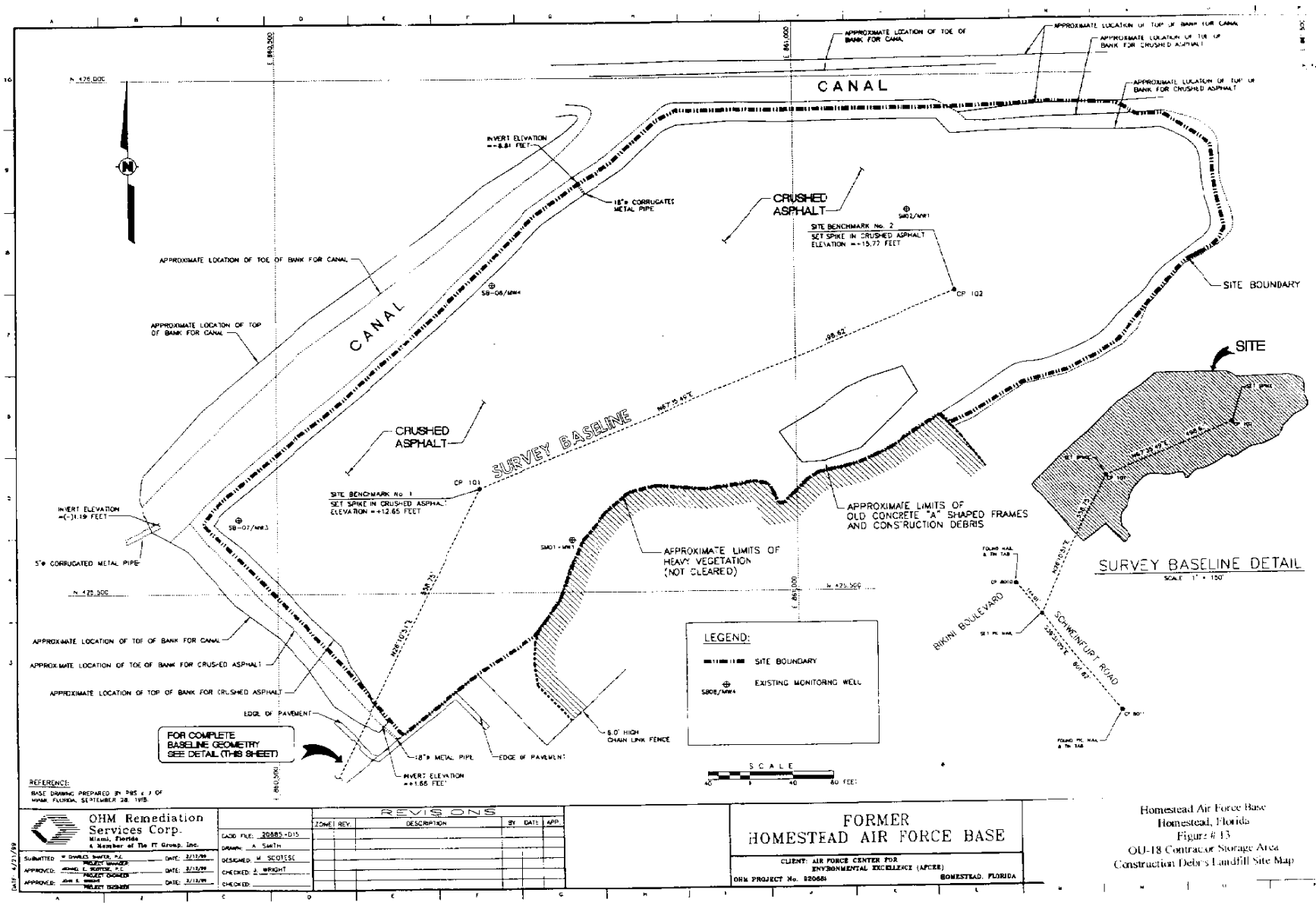
759
BULL RUN
DRAINAGE DITCH
793-4
793-3
793-5
784
793
(DEMOL SHED)
(DEMOLISHED)
790
CONCRETE APRON
793-1
793-2
ACCESS ROAD
APRON/TAXIWAY
LEGEND
GRASSY AREAS
SOIL BORING/MONITORING WELL
0 25 50 100
SCALE IN FEET
HOMESTEAD AIR RESERVE BASE
DESIGNED THOMAS
DRAWN MACLIN
1101 BRICKELL AVE
MIAMI, FLO
(305) 372-9724
Homestead Air Force Base
Homestead, Florida
Figure # 12
OU 17 Building 793 C-130 Fuel Release
Site Map



OHM Remediation Services Corp.
Miami, Florida
A Member of The FT Group, Inc.

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

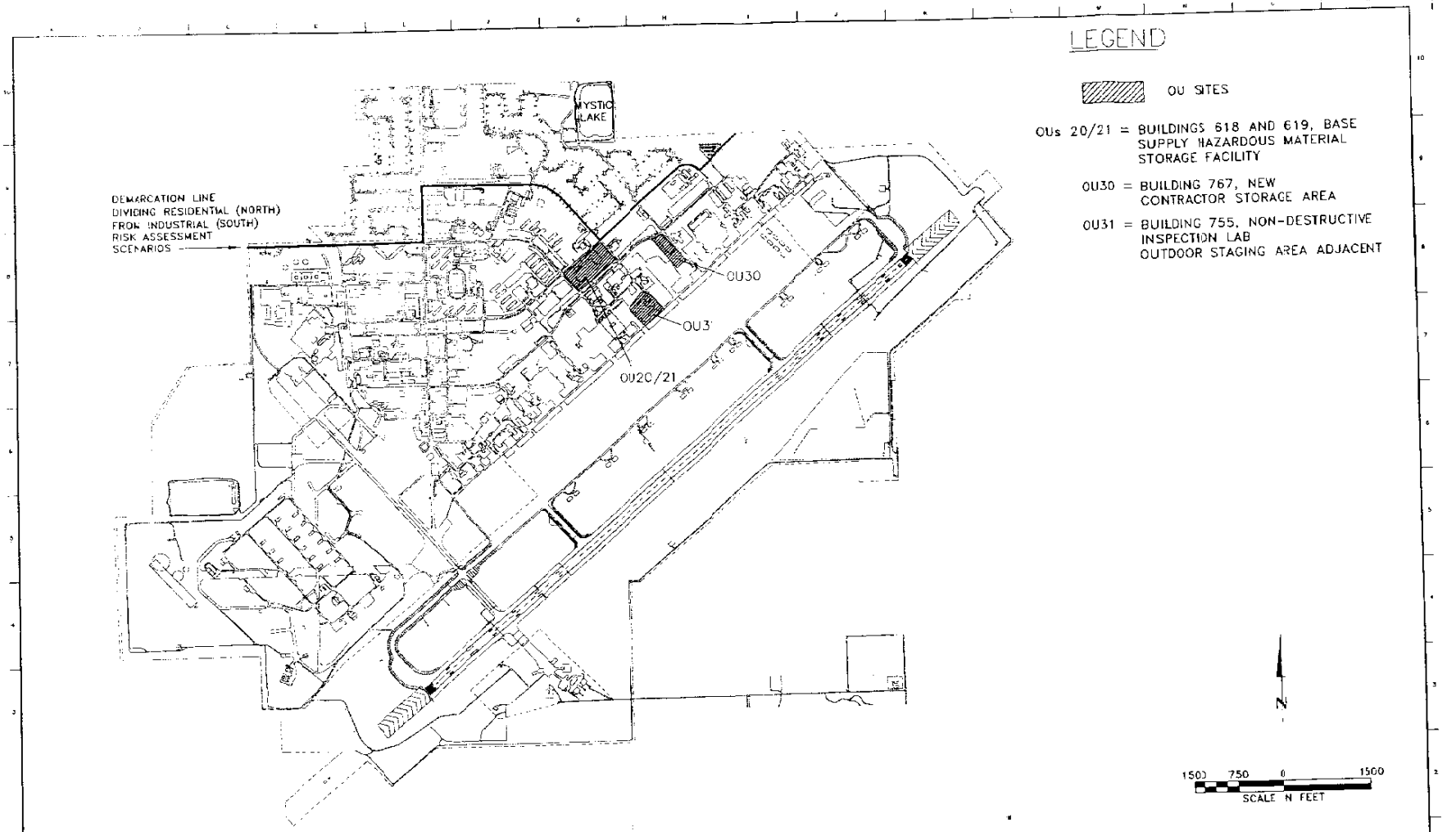
CADD FILE: 20685-015
DRAWN: A. SMITH
DESIGNED: M. SCOTESE
CHECKED: J. WRIGHT
CHECKED:

SUBMITTED: PROJECT MANAGER DATE: 2/12/99
APPROVED: PROJECT ENGINEER DATE: 2/12/99
APPROVED: PROJECT SUPERVISOR DATE: 2/12/99

FORMER
HOMESTEAD AIR FORCE BASE

CLIENT: AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
OHM PROJECT No. 20685 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 13
OU-18 Contractor Storage Area
Construction Debris Landfill Site Map



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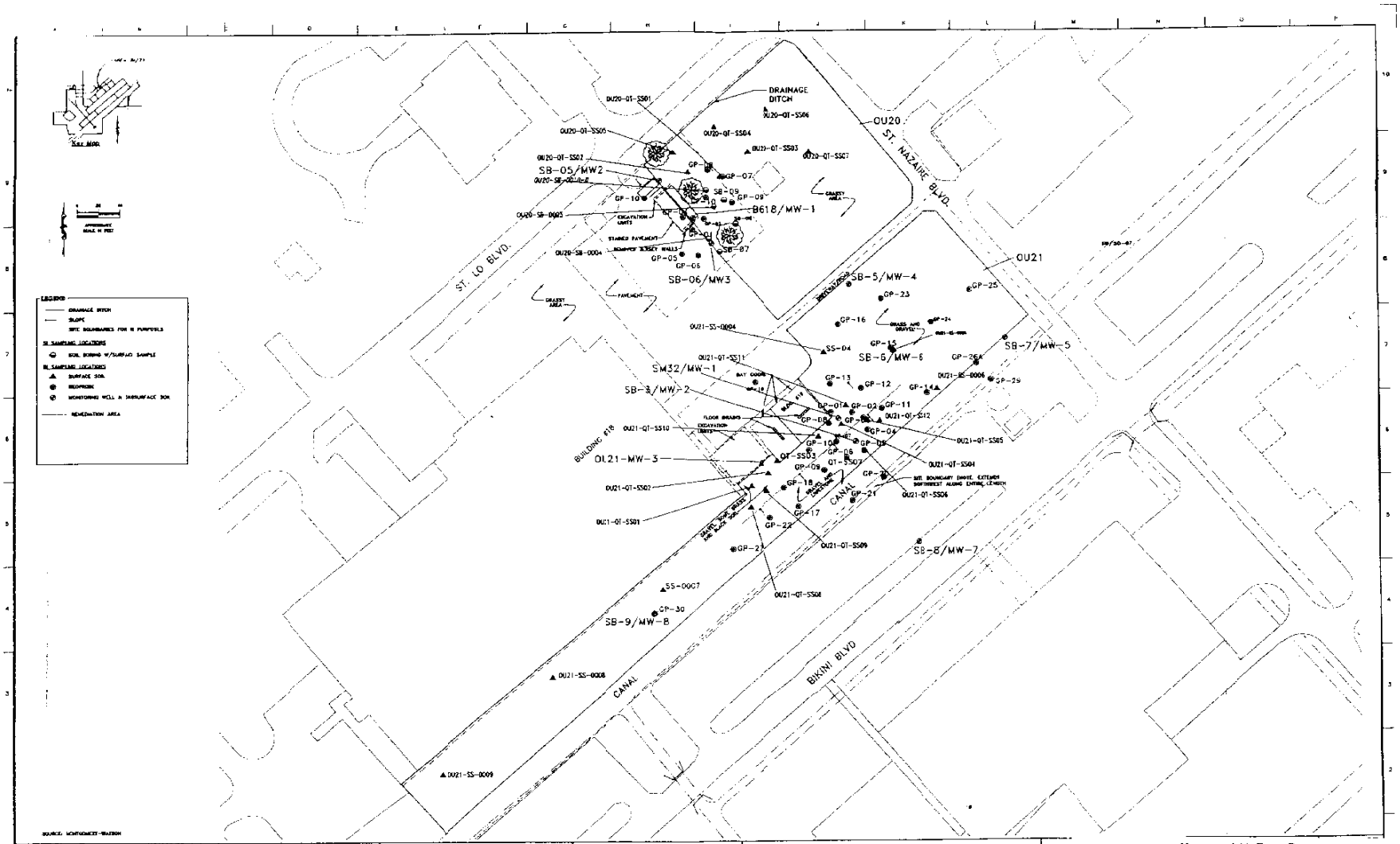
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

FORMER
HOMESTEAD AIR FORCE BASE

PROJECT No. 750942 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 15
OUs 20/21, 30 and 31 Location Map



the group

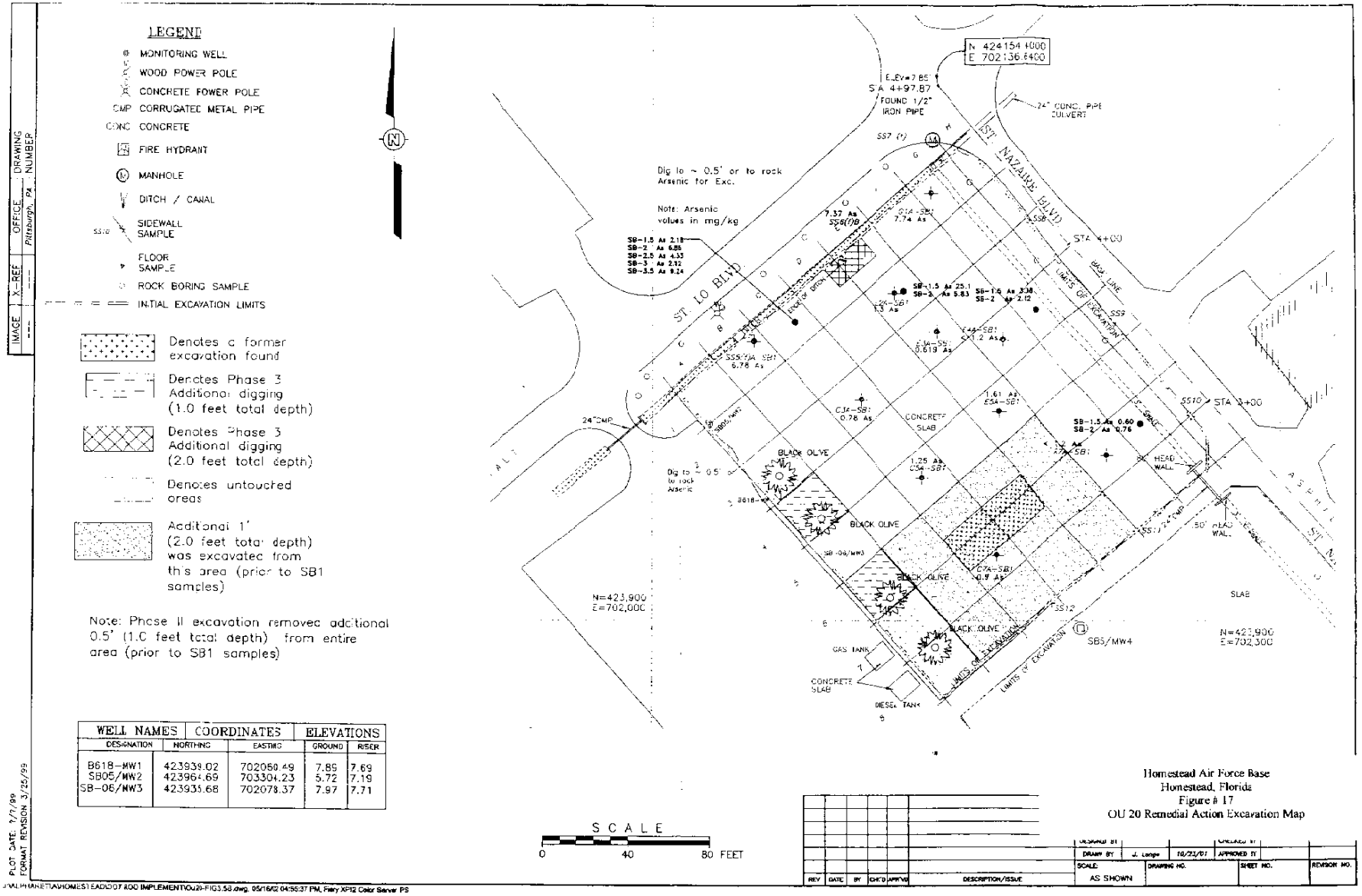
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

FORMER
HOMESTEAD AIR FORCE BASE

PROJECT No. 796942 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 16
OUs 20/21 Outdoor Staging Area /Base Supply
Hazardous Materials Storage Site Map

J:\VLHMARET\HOMESTEAD\IDO7 RCD IMPLEMENTING\1-4.dwg, 06/14/02 02:11:25 PM, HP LaserJet 5Si PCL 5e



WELL NAMES		COORDINATES		ELEVATIONS	
DESIGNATION		NORTHING	EASTING	GROUND	RISER
B618-MW1		423939.02	702060.49	7.89	7.69
SB05/MW2		423964.69	703304.23	5.72	7.19
SB-06/MW3		423935.68	702078.37	7.97	7.71

Homestead Air Force Base
Homestead, Florida
Figure # 17
OU 20 Remedial Action Excavation Map

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE

DRAWN BY: J. Lange 10/23/01 APPROVED BY:
SCALE: AS SHOWN
DRAWING NO.
SHEET NO.
REVISION NO.

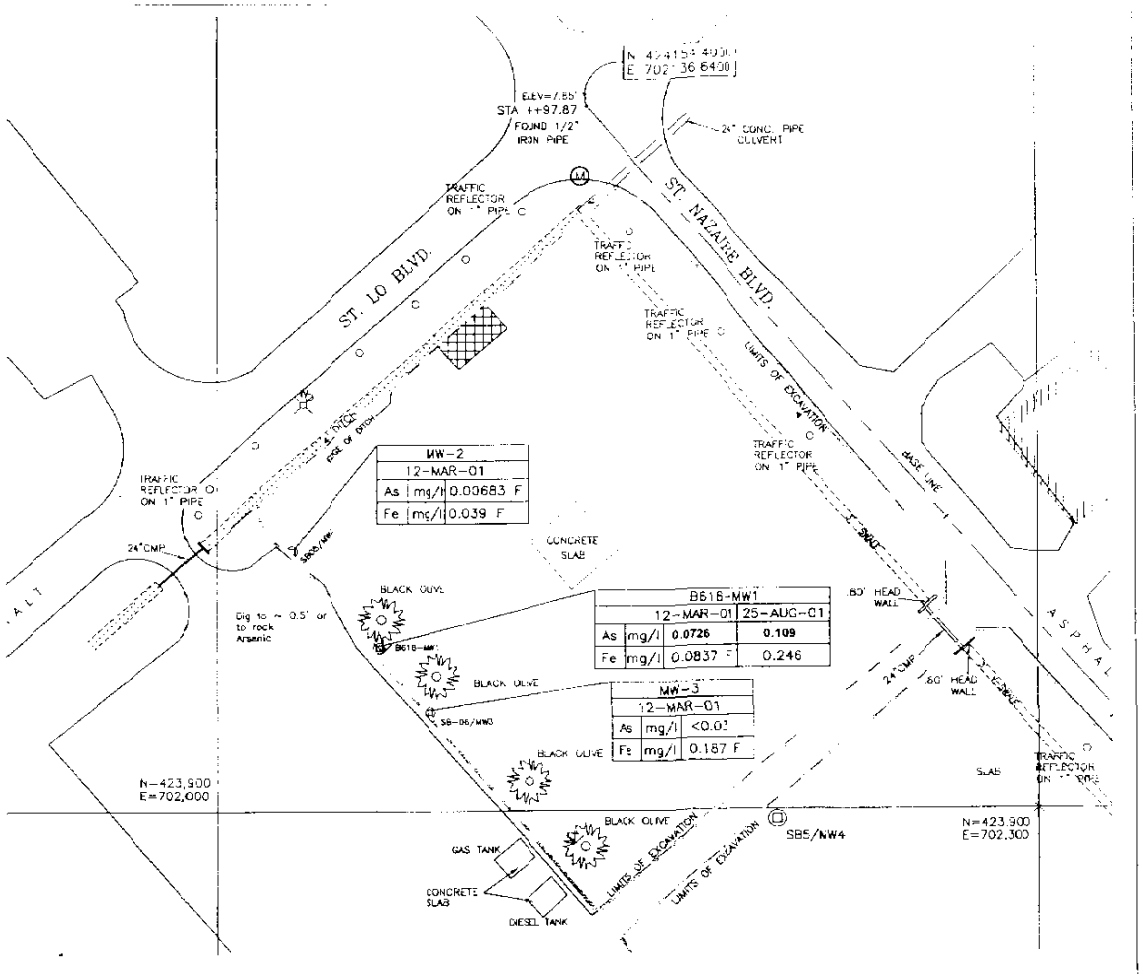
IMAGE: ---
X-REF: ---
OFFICE: Pittsburgh, PA
DRAWING NUMBER:
PLOT DATE: 1/7/99
FORMAT REVISION 3/26/99

J:\ALL\MARETIA\HOMEST\EADD07.ROD IMPLEMENT\OU20-FIG3.SB.dwg, 05/16/02 04:56:37 PM, Fiery XP12 Color Server PS

LEGEND

- MONITOR WELL
- WOOD POWER POLE
- CONCRETE POWER POLE
- CMP — CORRUGATED METAL PIPE
- CONC — CONCRETE
- FIRE HYDRANT
- MANHOLE
- DITCH / CANAL
- SSTG — SIDEWALL SAMPLE
- FINAL EXCAVATION LIMITS

WELL NAMES		COORDINATES		ELEVATIONS	
DESIGNATION		NORTHING	EASTING	GROUND	RISER
B618-MW1		423939.02	702060.49	7.89	7.69
SB05/MW2		423964.69	703304.23	5.72	7.19
SB-06/MW3		423935.68	702078.37	7.97	7.71



SCALE
0 40 80 FEET

Homestead Air Force Base
Homestead, Florida
Figure # 18
OU 20 2001 Groundwater Analytical Results

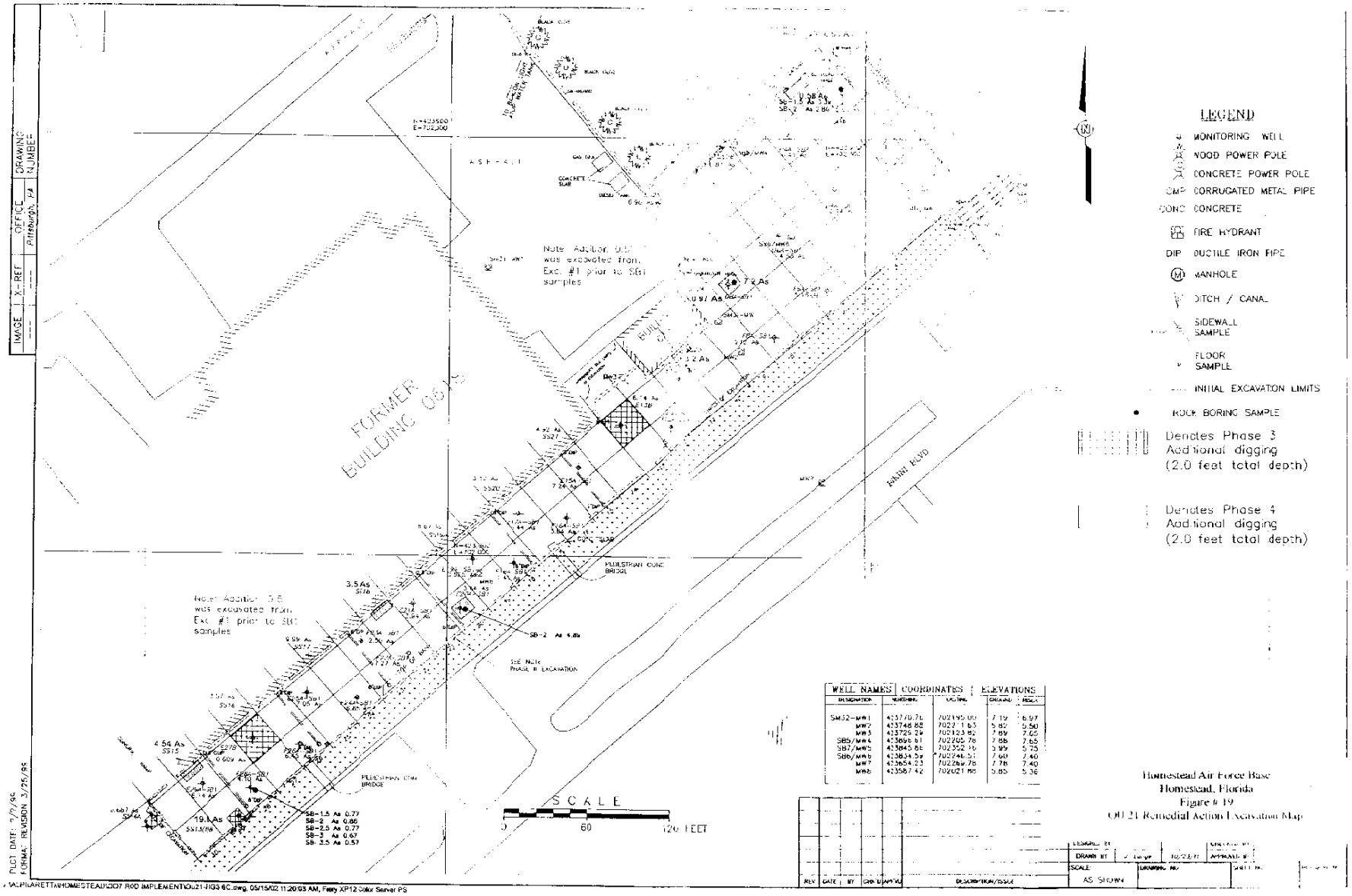
REV	DATE	BY	CHK'D	APP'D	DESCRIPTION/ISSUE

DRAWN BY: J. Lange 10/23/01 APPROVED BY:
SCALE: AS SHOWN
DRAWING NO.
SHEET NO.
REVISION NO.

IMAGE: ---
X-REF: ---
OFFICE: Pittsburgh, PA
DRAWING NUMBER:

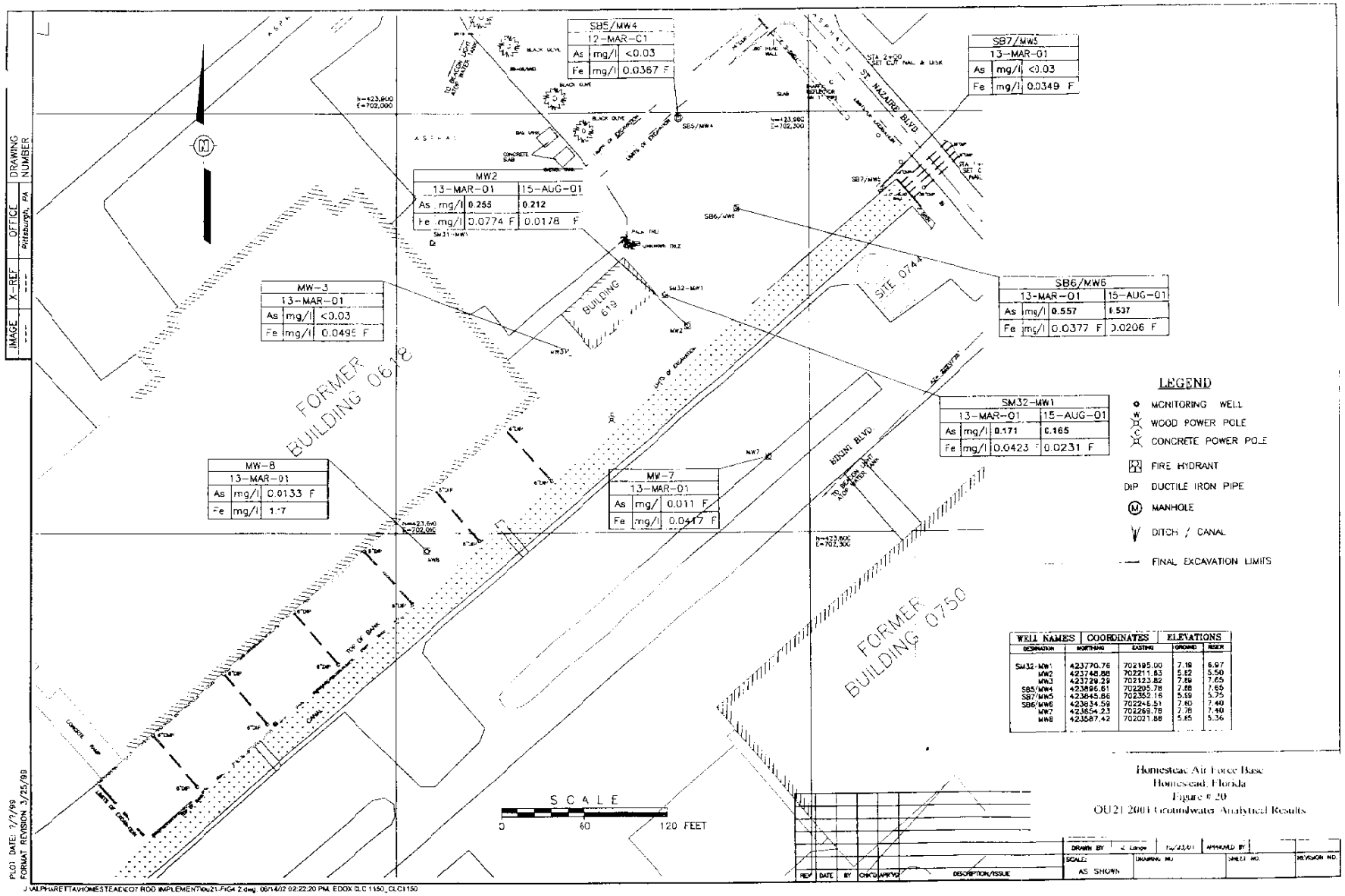
PLOT DATE: 7/7/99
FORMAT REVISION 3/25/99

J:\ALPHA\ETTA\HOMESTEAD\ECT RDD IMPLEMENT\OU20-FIG4_1.dwg 06/14/02 02:20:38 PM EDOX 3LC 1150_DLC 1150



WELL NAMES	COORDINATES		ELEVATIONS	
DESIGNATION	NORTHING	EASTING	GROUND	RISER
SM32-MW1	423770.76	702199.00	7.19	6.97
MW2	423748.85	702271.63	5.82	5.50
MW3	423725.29	702123.82	7.89	7.65
SB5/MW4	423695.81	702205.78	7.85	7.65
SB7/MW5	423845.86	702352.76	5.99	5.75
SB6/MW6	423834.59	702246.51	7.60	7.40
MW7	423654.23	702286.76	7.78	7.40
MW8	423587.42	702021.86	5.85	5.36

Homestead Air Force Base
Homestead, Florida
Figure # 19
OU 21 Remedial Action Excavation Map



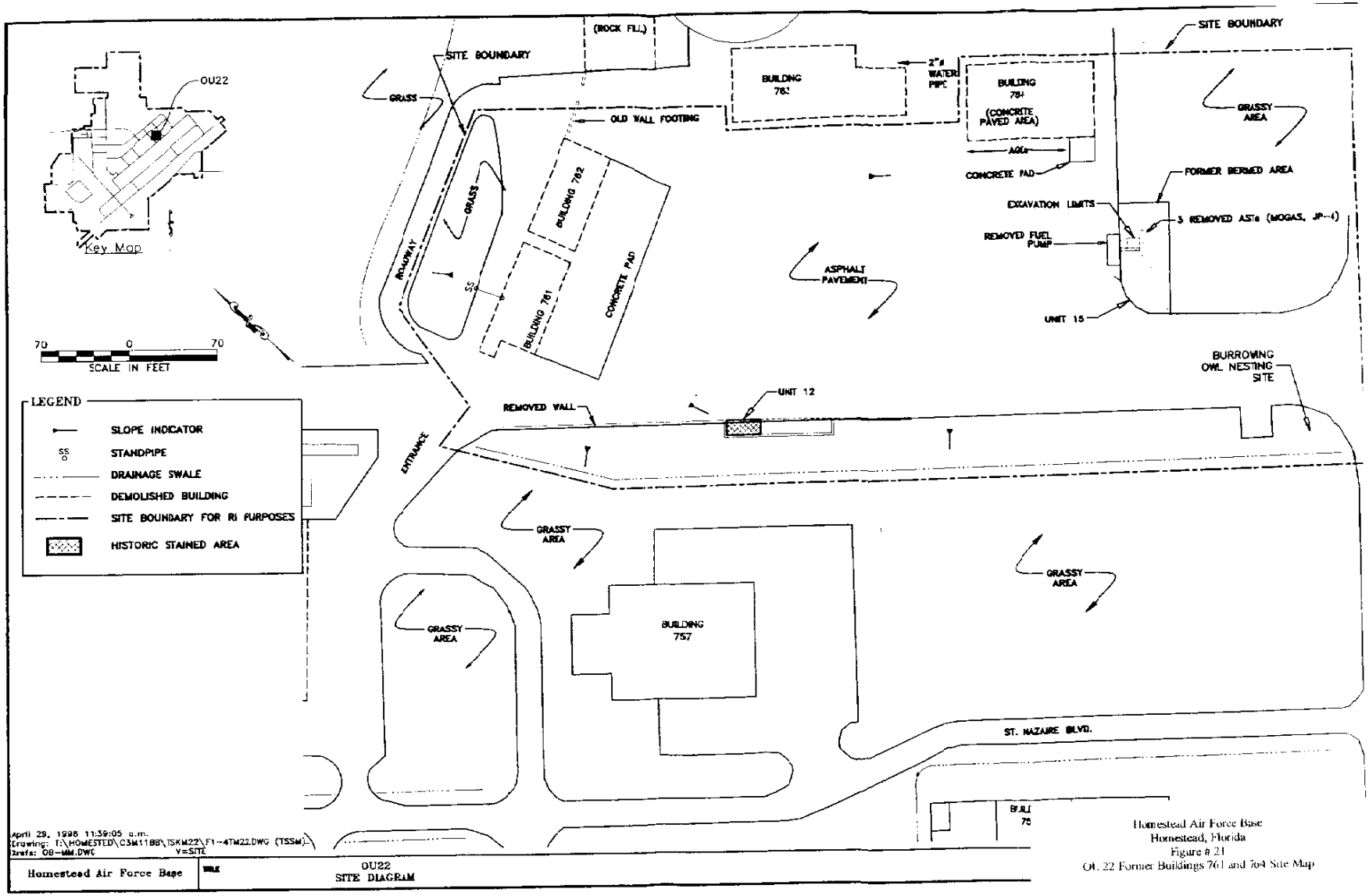
Homestead Air Force Base
Homestead, Florida
Figure # 20
OU21 2001 Groundwater Analytical Results

DRAWN BY: L. Lange 11/13/01 APPROVED BY:
SCALE: AS SHOWN
DRAWING NO.
SHEET NO.
REVISION NO.
REV DATE BY CHK'D APP'D DESCRIPTION/ISSUE

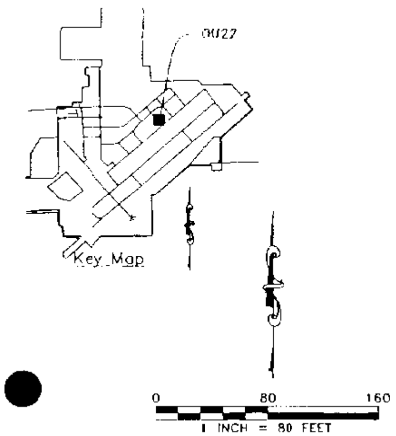
IMAGE --- X-REF --- OFFICE Pittsburgh, PA DRAWING NUMBER

PLOT DATE: 7/7/99
FORMAT REVISION 3/25/99

J:\ALPHARETTA\HOMESTEAD\CO7 ROD IMPLEMENT\ou21-FIG4 2.dwg 08/14/02 02:22:20 PM EDOX CLC 1150_CLC1150

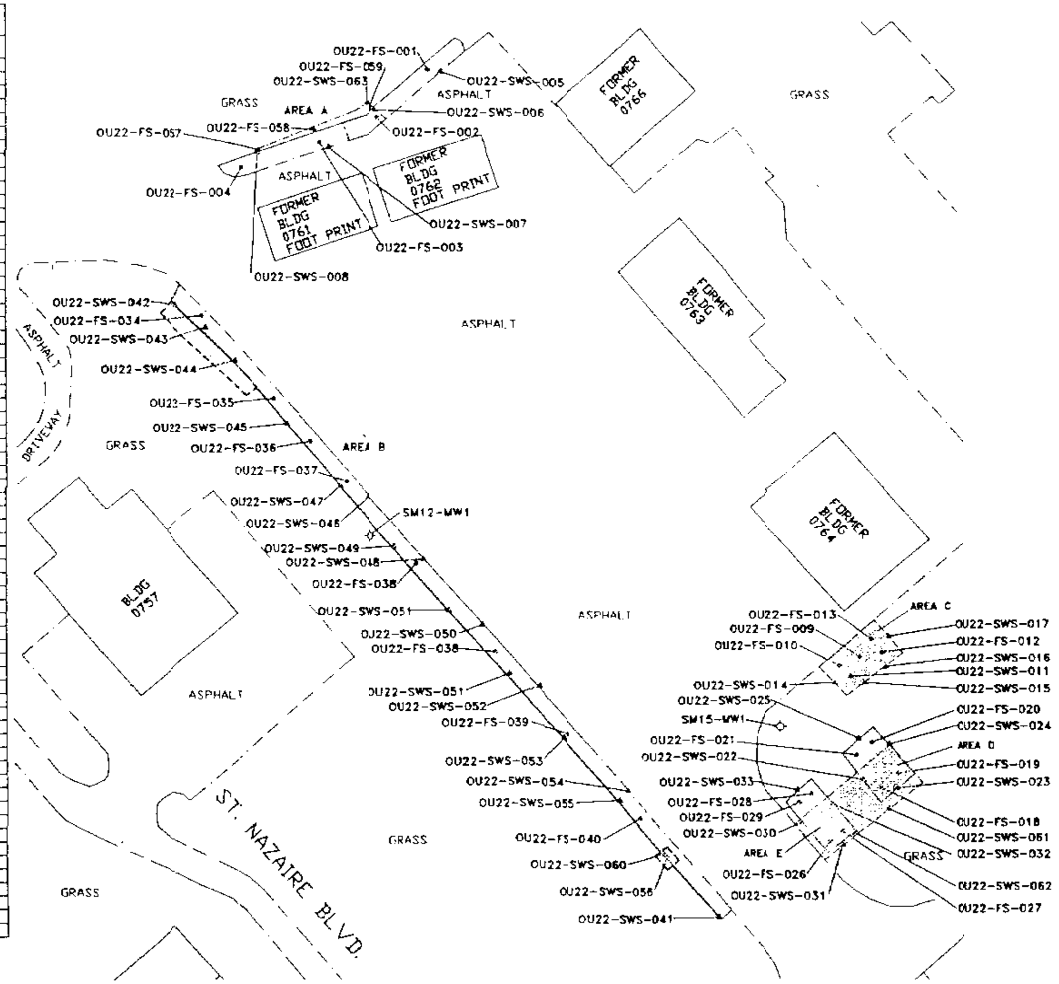


Homestead Air Force Base
Homestead, Florida
Figure # 21
OU 22 Former Buildings 761 and 764 Site Map



SOIL BORING LOCATIONS

N	E	Description
[illegible]	[illegible]	OU22-FS-057
[illegible]	[illegible]	OU22-FS-058
[illegible]	[illegible]	OU22-FS-059
[illegible]	[illegible]	OU22-SWS-060
[illegible]	[illegible]	OU22-SWS-062
[illegible]	[illegible]	OU22-SWS-061
[illegible]	[illegible]	OU22-SWS-063
[illegible]	[illegible]	OU22-SWS-006
[illegible]	[illegible]	OU22-FS-002
[illegible]	[illegible]	OU22-FS-003
[illegible]	[illegible]	OU22-SWS-005
[illegible]	[illegible]	OU22-SWS-007
[illegible]	[illegible]	OU22-FS-001
[illegible]	[illegible]	OU22-SWS-008
[illegible]	[illegible]	OU22-FS-004
[illegible]	[illegible]	OU22-SWS-017
[illegible]	[illegible]	OU22-FS-013
[illegible]	[illegible]	OU22-FS-012
[illegible]	[illegible]	OU22-SWS-016
[illegible]	[illegible]	OU22-FS-009
[illegible]	[illegible]	OU22-SWS-015
[illegible]	[illegible]	OU22-SWS-011
[illegible]	[illegible]	OU22-SWS-014
[illegible]	[illegible]	OU22-FS-010
[illegible]	[illegible]	[illegible]



OU22-FS-001
OU22-FS-059
OU22-SWS-063
OU22-SWS-005
GRASS
AREA A
ASPHALT
OU22-SWS-006
OU22-FS-057
OU22-FS-058
OU22-FS-002
FORMER BLDG 0766
GRASS
ASPHALT
FORMER BLDG 0762 FOOT PRINT
OU22-FS-004
FORMER BLDG 0761 FOOT PRINT
OU22-SWS-007
OU22-FS-003
OU22-SWS-008
FORMER BLDG 0763
OU22-SWS-042
OU22-FS-034
ASPHALT
OU22-SWS-043
ASPHALT
OU22-SWS-044
OU22-FS-035
DRIVEWAY
OU22-SWS-045
GRASS
OU22-FS-036
AREA B
OU22-FS-037
OU22-SWS-047
SM12-MW1
OU22-SWS-046
FORMER BLDG 0764
OU22-SWS-049
OU22-SWS-048
BLDG 0757
OU22-FS-038
OU22-SWS-051
ASPHALT
OU22-FS-013
AREA C
OU22-SWS-050
OU22-FS-009
OU22-SWS-017
OU22-FS-038
OU22-FS-010
OU22-FS-012
OU22-SWS-016
OU22-SWS-011
ASPHALT
OU22-SWS-014
OU22-SWS-015
OU22-SWS-051
OU22-SWS-052
OU22-SWS-025
OU22-FS-020
SM15-MW1
OU22-SWS-024
OU22-FS-039
OU22-FS-021
AREA D
OU22-SWS-022
OU22-FS-019
OU22-SWS-053
OU22-SWS-033
OU22-SWS-023
OU22-SWS-054
OU22-FS-028
OU22-SWS-055
OU22-FS-029
OU22-FS-018
ST. NAZAIRE BLVD.
GRASS
OU22-SWS-030
OU22-SWS-061
OU22-FS-040
AREA E
GRASS
OU22-SWS-032
OU22-SWS-060
OU22-FS-026
GRASS
OU22-SWS-056
OU22-SWS-031
OU22-SWS-062
OU22-SWS-041
OU22-FS-027

LEGEND

- MONITORING WELL
- CURB
- PHASE III EXCAVATION
- PHASE II EXCAVATION
- EXCAVATION AREA

the IT group

AT FULL SCALE	
OOO FILE:	
DRAWN:	L. SHULMAN
DESIGNED:	
CHECKED:	
CHECKED:	

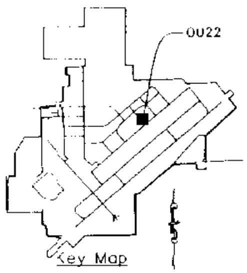
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	ADDED MONITORING WELL LOCATIONS	LS	[illegible]	

FORMER HOMESTEAD AIR FORCE BASE

OHM PROJECT No. 92065 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure #22
OU-22 Remedial Activities Excavation Map

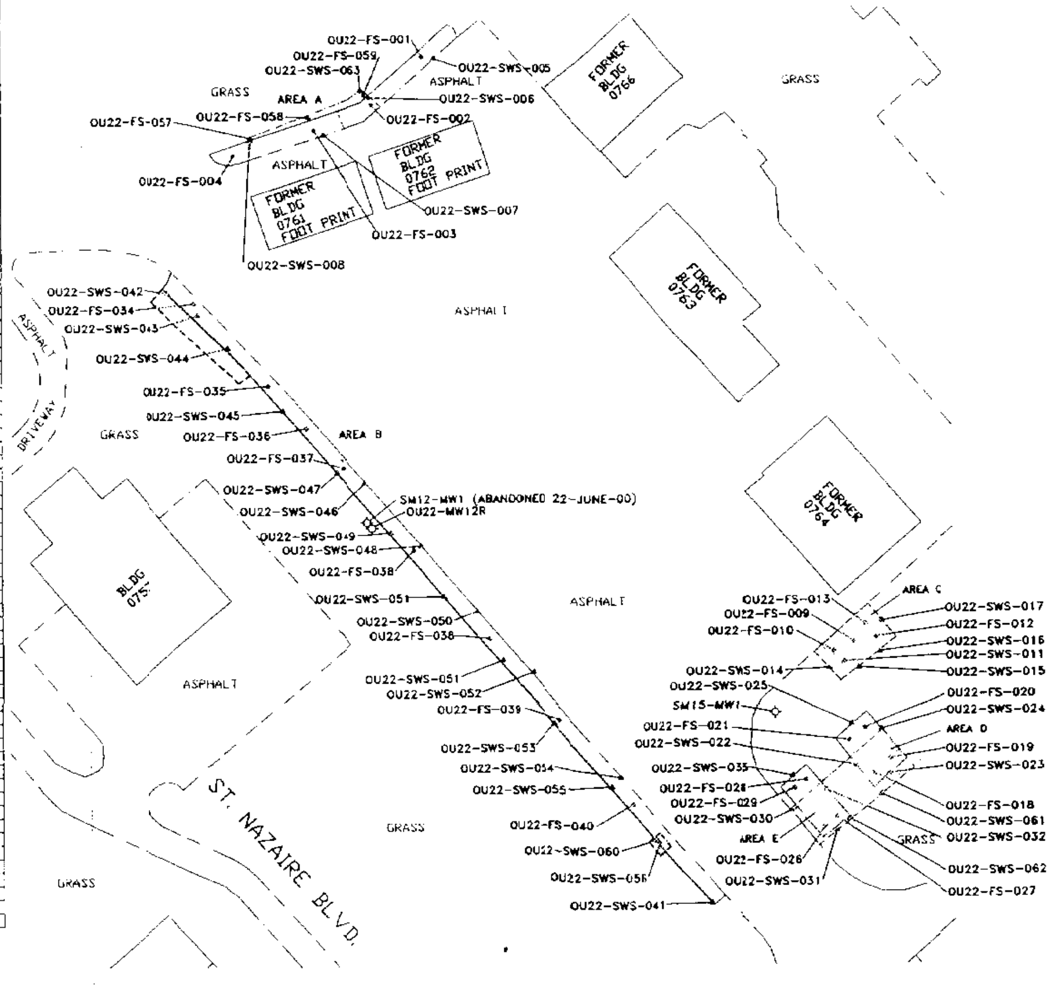


0 80 160
1 INCH = 80 FEET

LEGEND
- MONITORING WELL
- CURB
- PHASE III EXCAVATION
- PHASE II EXCAVATION
- EXCAVATION AREA

SOIL BORING LOCATIONS

N	E	Description
423776.4410	703010.5160	OU22-FS-057
423785.1300	703039.7321	OU22-FS-058
423801.4140	703100.4929	OU22-FS-059
423862.5730	703109.6491	OU22-SWS-063
423277.4300	703447.9620	OU22-SWS-062
423294.5620	703471.0610	OU22-SWS-061
423304.2640	703497.8490	OU22-SWS-060
423799.1020	703104.2100	OU22-SWS-005
423793.8630	703106.1410	OU22-FS-002
423828.2140	703142.5710	OU22-FS-001
423827.9390	703151.3790	OU22-SWS-006
423772.5140	703070.1970	OU22-SWS-007
423776.0150	703063.4160	OU22-FS-003
423765.9600	703019.8240	OU22-SWS-008
423757.9250	703006.1300	OU22-FS-004
423419.5780	703471.8040	OU22-SWS-017
423417.4960	703459.7130	OU22-FS-013
423408.1850	703447.2940	OU22-FS-012
423397.4400	703469.4810	OU22-SWS-014
423404.8700	703451.6700	OU22-FS-009
423385.9000	703454.4450	OU22-SWS-011
423390.5100	703444.5640	OU22-SWS-015
423385.9500	703432.5470	OU22-SWS-016
423398.1640	703436.8250	OU22-FS-010
423315.9780	703452.8130	OU22-SWS-022
423329.4250	703465.4310	OU22-FS-018
423309.1920	703476.5890	OU22-SWS-023
423309.2220	703477.3740	OU22-FS-019
423336.3090	703475.3200	OU22-SWS-024
423342.3030	703459.1180	OU22-FS-020
423345.2660	703450.0900	OU22-SWS-025
423363.5000	703447.9410	OU22-FS-021
423299.3640	703408.1150	OU22-FS-029
423300.0700	703406.9660	OU22-SWS-030
423305.4400	703416.4300	OU22-FS-028
423297.8850	703431.6920	OU22-SWS-032
423280.3736	703413.3178	OU22-SWS-035
423271.6120	703430.0260	OU22-FS-026
423268.3770	703438.1150	OU22-SWS-031
423278.3580	703438.3690	OU22-FS-027
423216.9890	703346.3550	OU22-SW-041
423260.1020	703302.1210	OU22-SWS-056
423280.6000	703292.0750	OU22-FS-040
423307.8000	703283.3600	OU22-SWS-054
423300.1220	703276.8370	OU22-SWS-055
423049.1320	703239.9800	OU22-FS-039
423046.4170	703236.7400	OU22-SWS-053
423083.8370	703220.0110	OU22-SWS-052
423092.3050	703198.6250	OU22-SWS-051
423100.2950	703188.2390	OU22-FS-038
423127.9350	703179.3480	OU22-SWS-050
423130.4910	703155.8840	OU22-SWS-048
423172.7260	703133.3230	OU22-FS-036
423175.7380	703128.4940	OU22-SWS-048
423165.3900	703117.1730	OU22-SWS-049
423521.1970	703090.7500	OU22-SWS-046
423532.5200	703082.3950	OU22-FS-037
423529.4200	703070.2420	OU22-SWS-047
423561.2530	703056.1720	OU22-FS-036
423574.2750	703039.4710	OU22-SWS-045
423592.2960	703029.3170	OU22-FS-035
423619.9016	703006.9780	OU22-SWS-044
423643.8280	702990.0800	OU22-SWS-043
423652.4750	702977.4100	OU22-FS-034
423664.3936	702962.2970	OU22-SWS-042



the group

SUBMITTED	PROJECT MANAGER	DATE
APPROVED	PROJECT ENGINEER	DATE
APPROVED	DEPT MANAGER	DATE

AT FULL SCALE

CADD FILE

DRAWN: L. SHULMAN

DESIGNED

CHECKED

CHECKED

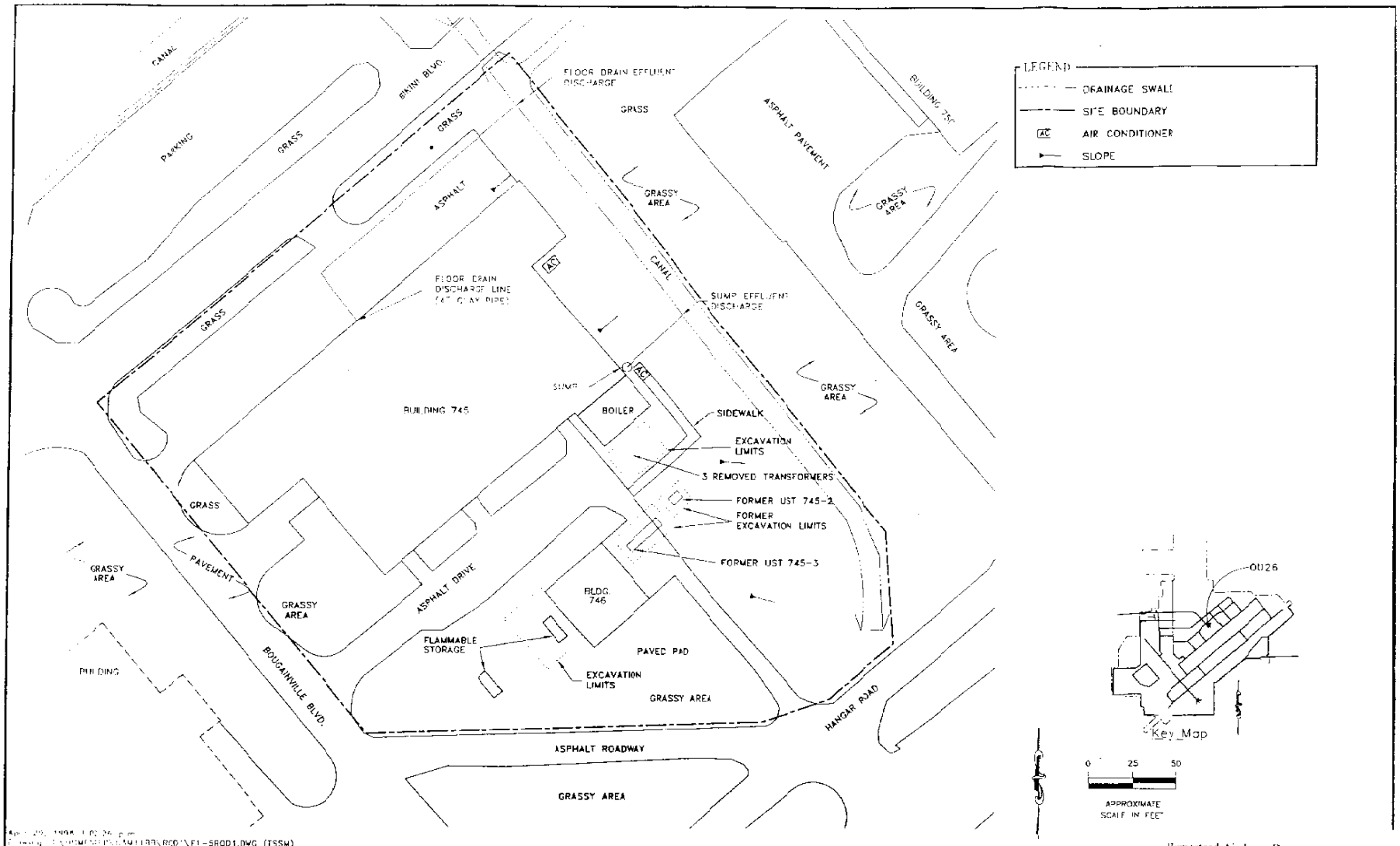
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	1	ADDED MONITORING WELL LOCATIONS	LS		

FORMER
HOMESTEAD AIR FORCE BASE

OHM PROJECT No. 920685 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 23
OU-22 Monitoring Well Location

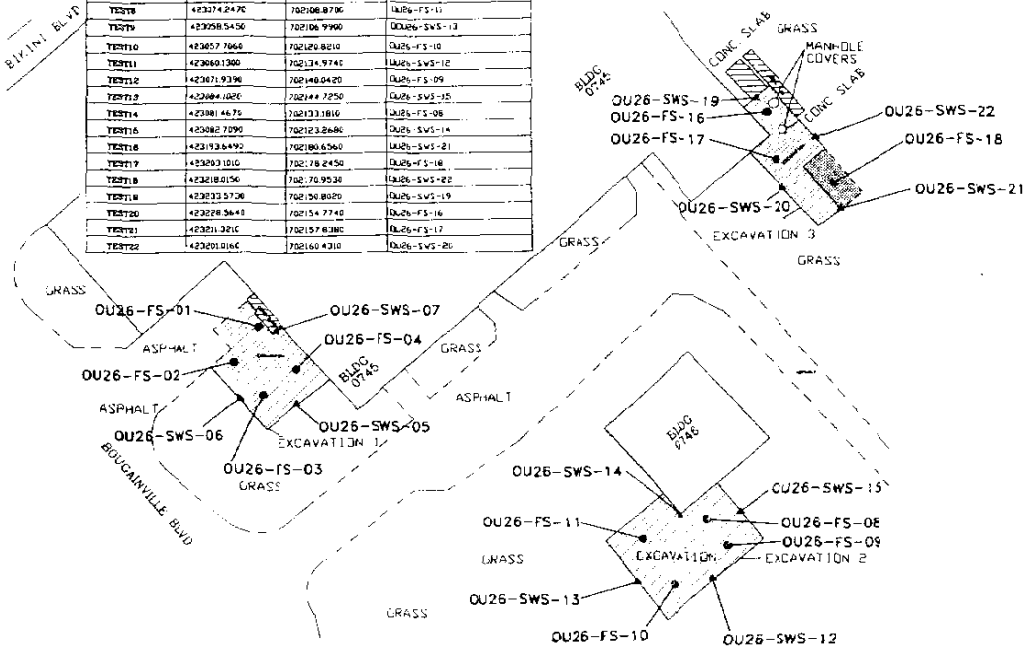


Homestead Air Force Base
Homestead, Florida
Figure # 24
OU 26 Aircraft Fabrication Shop Site Map

Homestead Air Force Base | title: OU26 SITE DIAGRAM

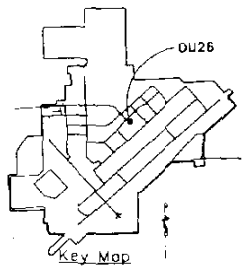
SOIL BORING LOCATIONS

Name	N	E	Description
TEST1	423151.6310	701970.9620	OU26-FS-01
TEST2	423149.8010	701977.2110	OU26-SWS-07
TEST3	423138.6240	701962.6730	OU26-FS-02
TEST4	423129.4510	701964.5550	OU26-SWS-06
TEST5	423126.8740	701972.6080	OU26-FS-03
TEST6	423123.6820	701984.8960	OU26-SWS-05
TEST7	423136.2130	701984.8990	OU26-FS-04
TEST8	423174.2470	702108.8700	OU26-FS-11
TEST9	423058.5450	702106.9900	OU26-SWS-13
TEST10	423057.7060	702120.8210	OU26-FS-10
TEST11	423060.1300	702134.9740	OU26-SWS-12
TEST12	423071.9390	702146.0420	OU26-FS-09
TEST13	423084.1020	702144.7250	OU26-SWS-15
TEST14	423081.4675	702133.1810	OU26-FS-08
TEST15	423082.7090	702123.2680	OU26-SWS-14
TEST16	423193.6490	702180.6560	OU26-SWS-21
TEST17	423203.1010	702178.2450	OU26-FS-18
TEST18	423218.0150	702170.9530	OU26-SWS-22
TEST19	423233.5720	702150.8020	OU26-SWS-19
TEST20	423228.3640	702154.7740	OU26-FS-16
TEST21	423211.3210	702157.6380	OU26-FS-17
TEST22	423201.0160	702160.4310	OU26-SWS-20



LEGEND

- EXCLUSION ZONE
- STAGING AREA LIMITS
- MONITORING WELL
- VAULT MANWAYS
- AC AIR CONDITIONER
- SLOPE
- SOIL STAGING AREA
- CURB
- PHASE II EXCAVATION
- EXCAVATION AREA



0 20 40

APPROXIMATE
1 INCH = 40 FEET

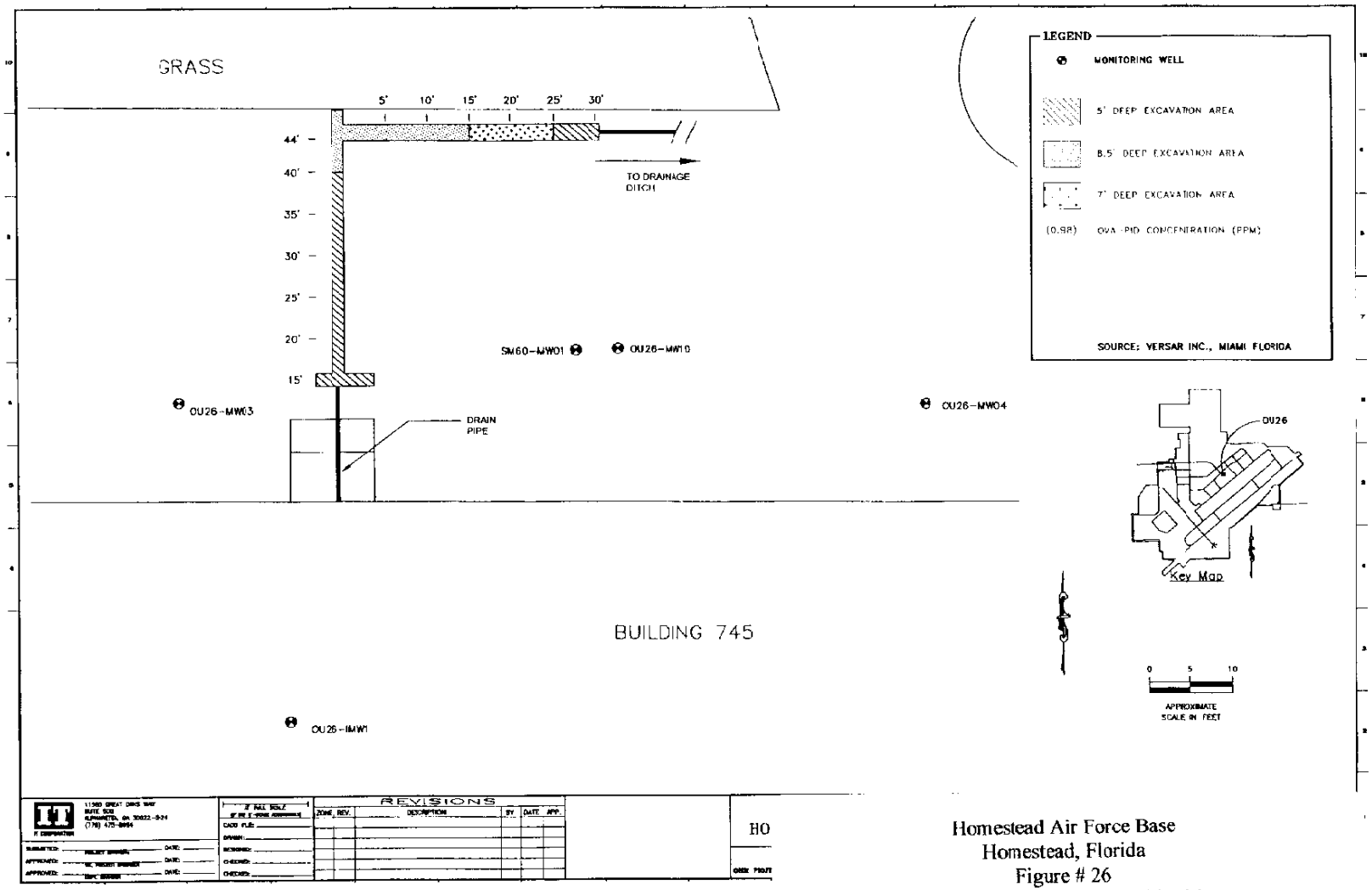
the group

REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

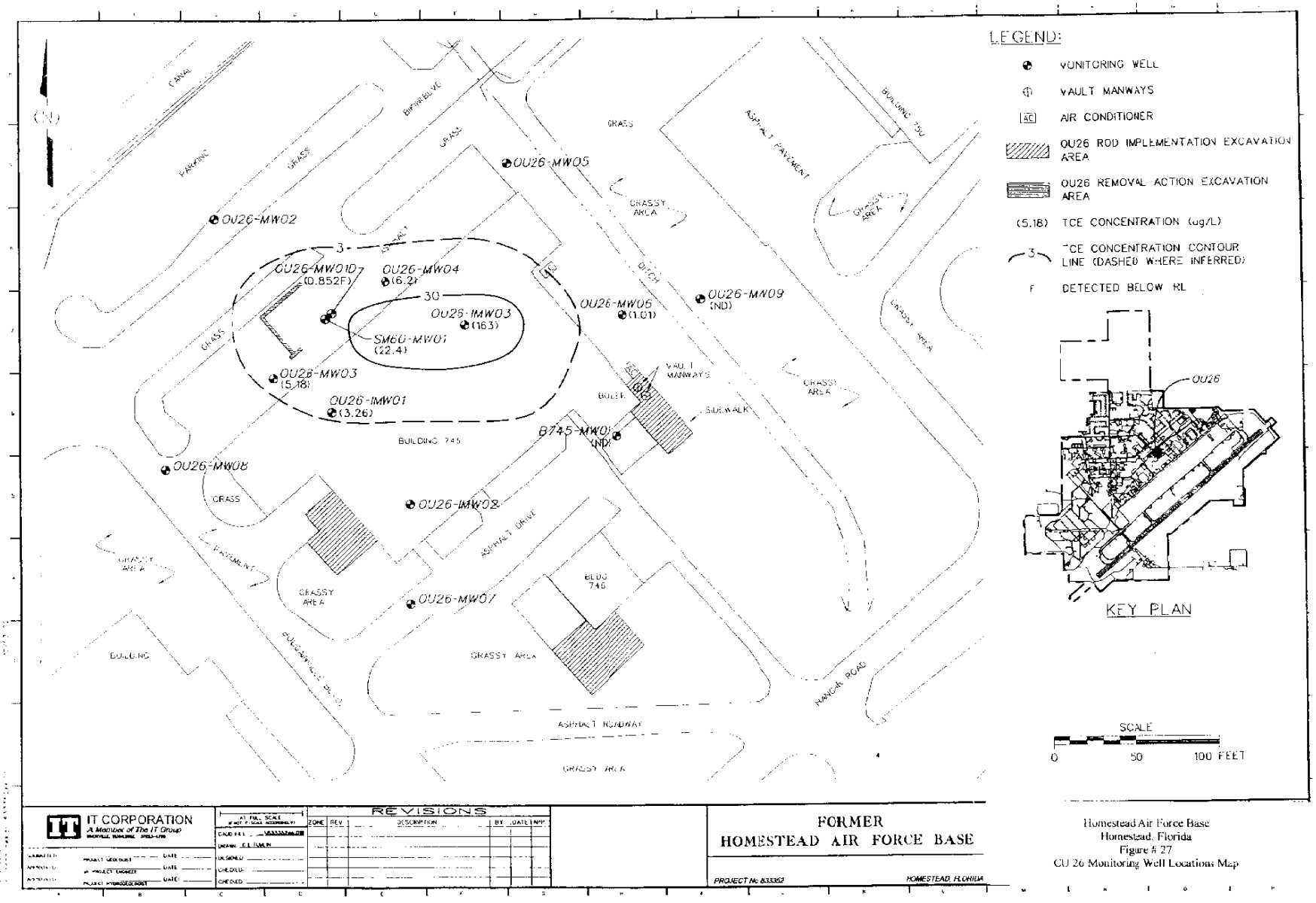
FORMER
HOMESTEAD AIR FORCE BASE

OHM PROJECT No. 020665 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 25
OU 26 Remedial Activities Excavation Map



Homestead Air Force Base
Homestead, Florida
Figure # 26
OU 26 2002 Remedial Activities Map



IT CORPORATION
A Member of The IT Group

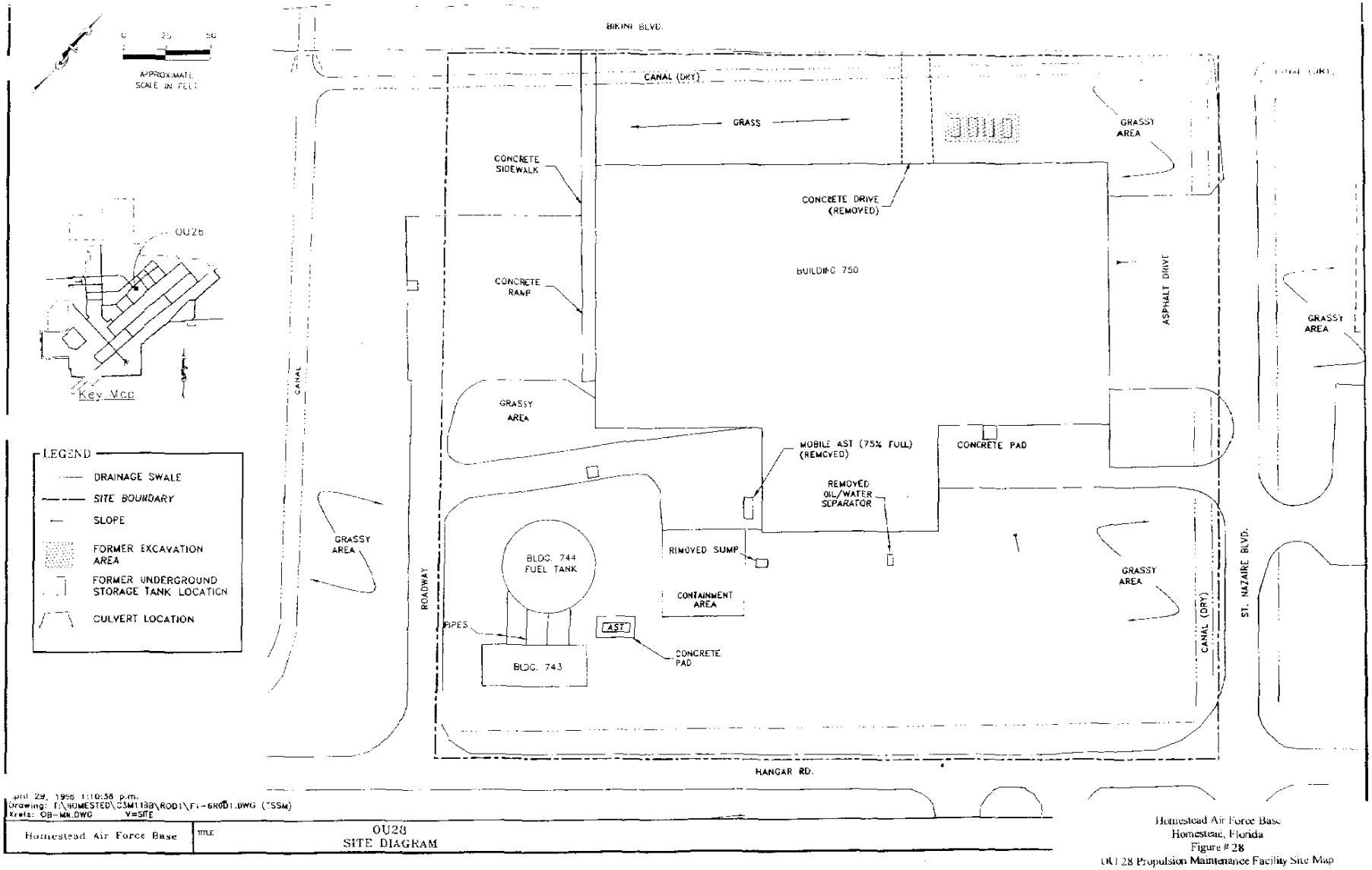
REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE

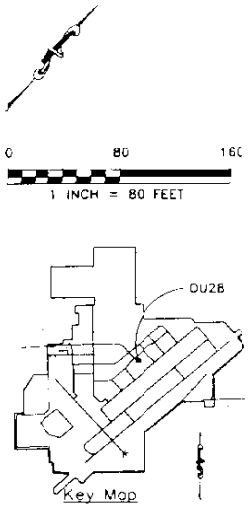
FORMER
HOMESTEAD AIR FORCE BASE

PROJECT No. 833352 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 27
CU 26 Monitoring Well Locations Map

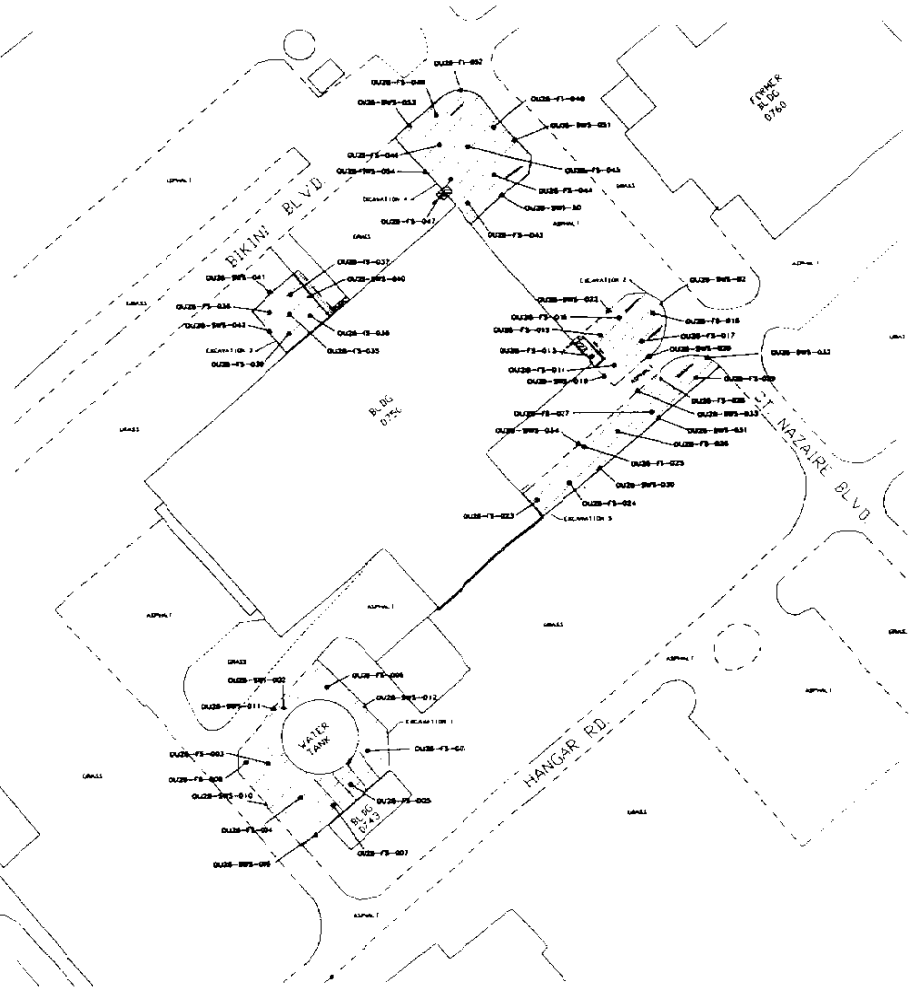


Homestead Air Force Base
Homestead, Florida
Figure # 28
OU 28 Propulsion Maintenance Facility Site Map



SOIL BORING LOCATIONS

Name	N	E	Description
TEST83	423301.1460	702331.6930	OU28-FS-002
TEST84	423089.3740	702324.3780	OU28-SWS-001
TEST85	423265.5730	702320.3120	OU28-FS-003
TEST86	423270.3950	702303.0330	OU28-FS-008
TEST87	423240.0640	702317.9070	OU28-SWS-010
TEST35	423459.0540	702916.4740	OU28-FS-023
TEST36	423475.5720	702539.0370	OU28-FS-024
TEST37	423481.8050	702360.2280	OU28-SWS-030
TEST38	423197.5460	702549.4990	OU28-FS-025
TEST39	423199.5880	702545.5360	OU28-SWS-034
TEST40	423068.2210	702573.5670	OU28-FS-026
TEST41	423219.9650	702598.2120	OU28-FS-027
TEST42	423517.6960	702603.0250	OU28-SWS-031
TEST43	423537.3120	702588.3690	OU28-SWS-033
TEST44	423545.9730	702605.4290	OU28-FS-029
TEST45	423541.1160	702630.8340	OU28-FS-029
TEST46	423560.4210	702638.8470	OU28-SWS-032
TEST47	423562.8600	702555.8910	OU28-FS-013
TEST48	423578.1050	702562.0770	OU28-FS-015
TEST49	423596.3450	702571.6520	OU28-FS-014
TEST50	423573.1170	702591.8970	OU28-FS-017
TEST51	423595.5560	702568.3280	OU28-SWS-022
TEST52	423590.4685	702575.7370	OU28-FS-016
TEST53	423593.3606	702599.8600	OU28-FS-018
TEST54	423600.0540	702606.2960	OU28-SWS-02
TEST55	423562.1310	702596.3460	OU28-SWS-020
TEST56	423548.5670	702564.4300	OU28-SWS-019
TEST91	423696.5500	702135.4840	OU28-SWS-054
TEST92	423690.8188	702153.5166	OU28-FS-047
TEST93	423715.6560	702145.4910	OU28-FS-046
TEST94	423713.7870	702468.4830	OU28-FS-045
TEST95	423693.2920	702488.9190	OU28-FS-044
TEST96	423727.0380	702486.6320	OU28-FS-048
TEST100	423754.3590	702461.8670	OU28-FS-052
TEST101	423736.8525	702443.3630	OU28-FS-049
TEST102	423729.8620	702424.1970	OU28-SWS-053
TEST103	423436.1720	702352.7490	OU28-SWS-040
TEST104	423591.0960	702352.3060	OU28-FS-036
TEST105	423636.9960	702338.6310	OU28-FS-037
TEST106	423610.9350	702324.0850	OU28-SWS-041
TEST107	423596.3520	702323.8610	OU28-FS-038
TEST108	423582.9880	702323.6750	OU28-SWS-042
TEST109	423595.1530	702337.9980	OU28-FS 035
TEST110	423561.0830	702337.6410	OU28-FS-039



LEGEND

- CURB
- PHASE II EXCAVATION
- EXCAVATION AREA

the group

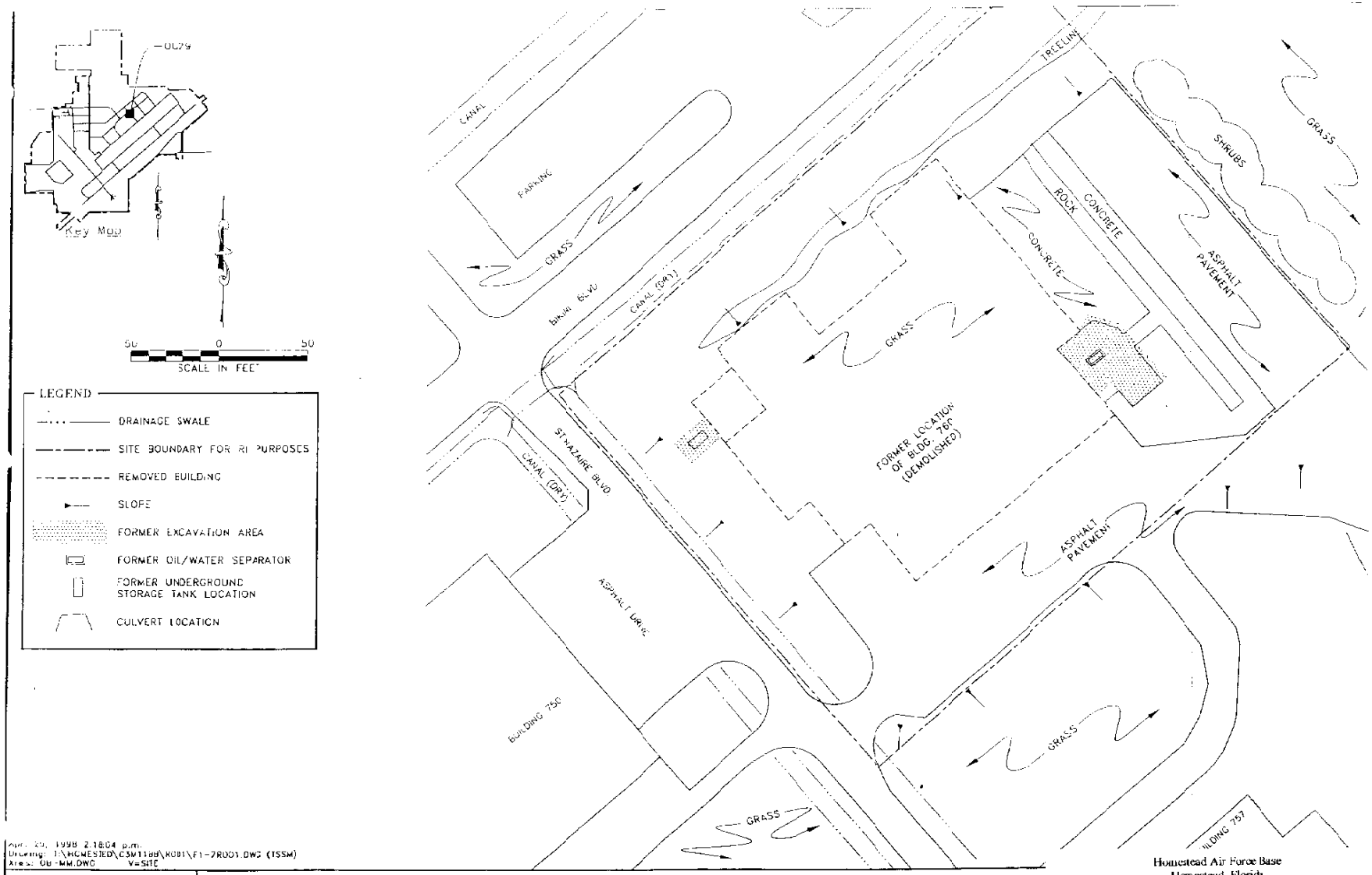
REVISIONS

ZONE REV	DESCRIPTION	BY	DATE	APP

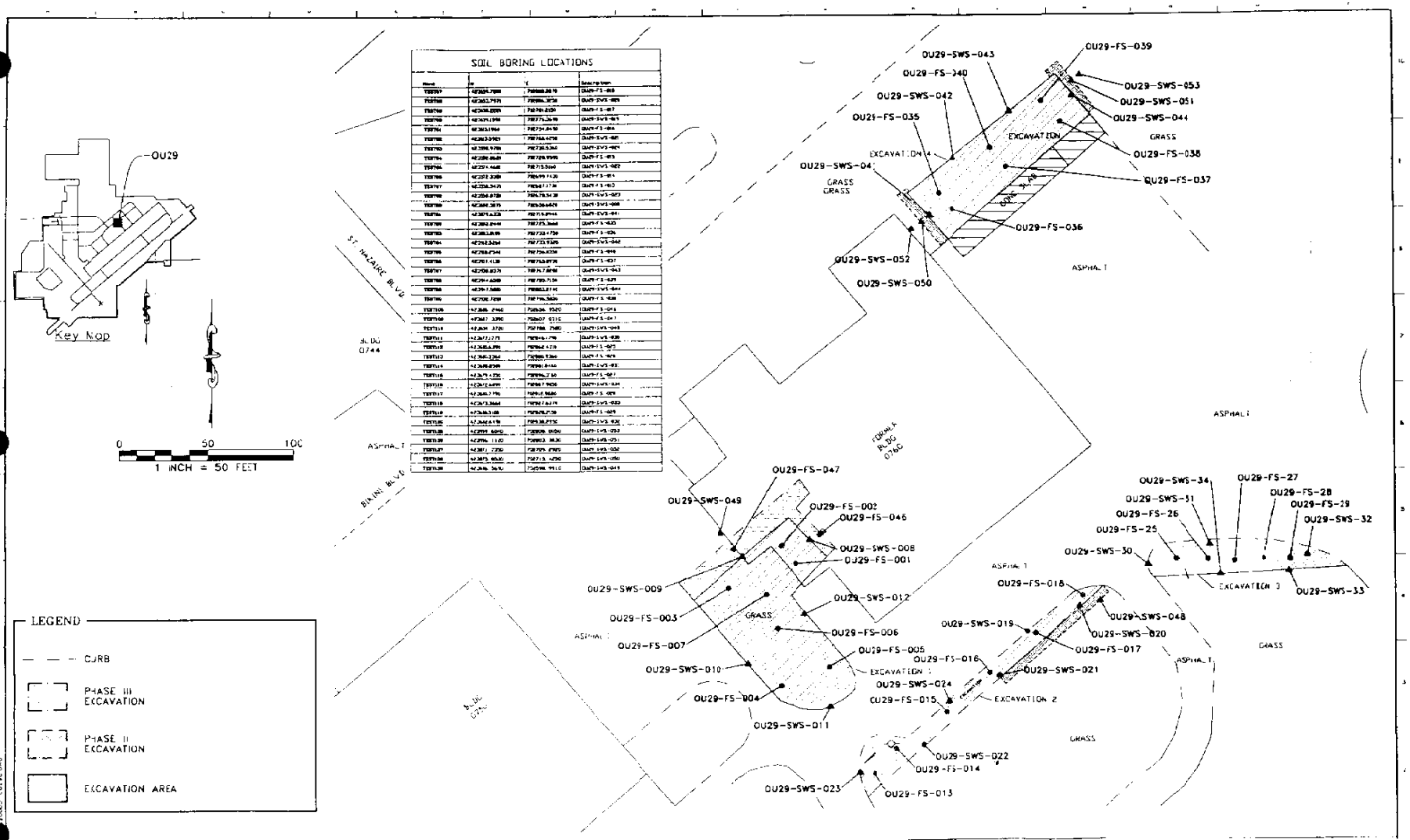
FORMER
HOMESTEAD AIR FORCE BASE

DRB PROJECT No. 920685 HOMESTEAD, FLORIDA

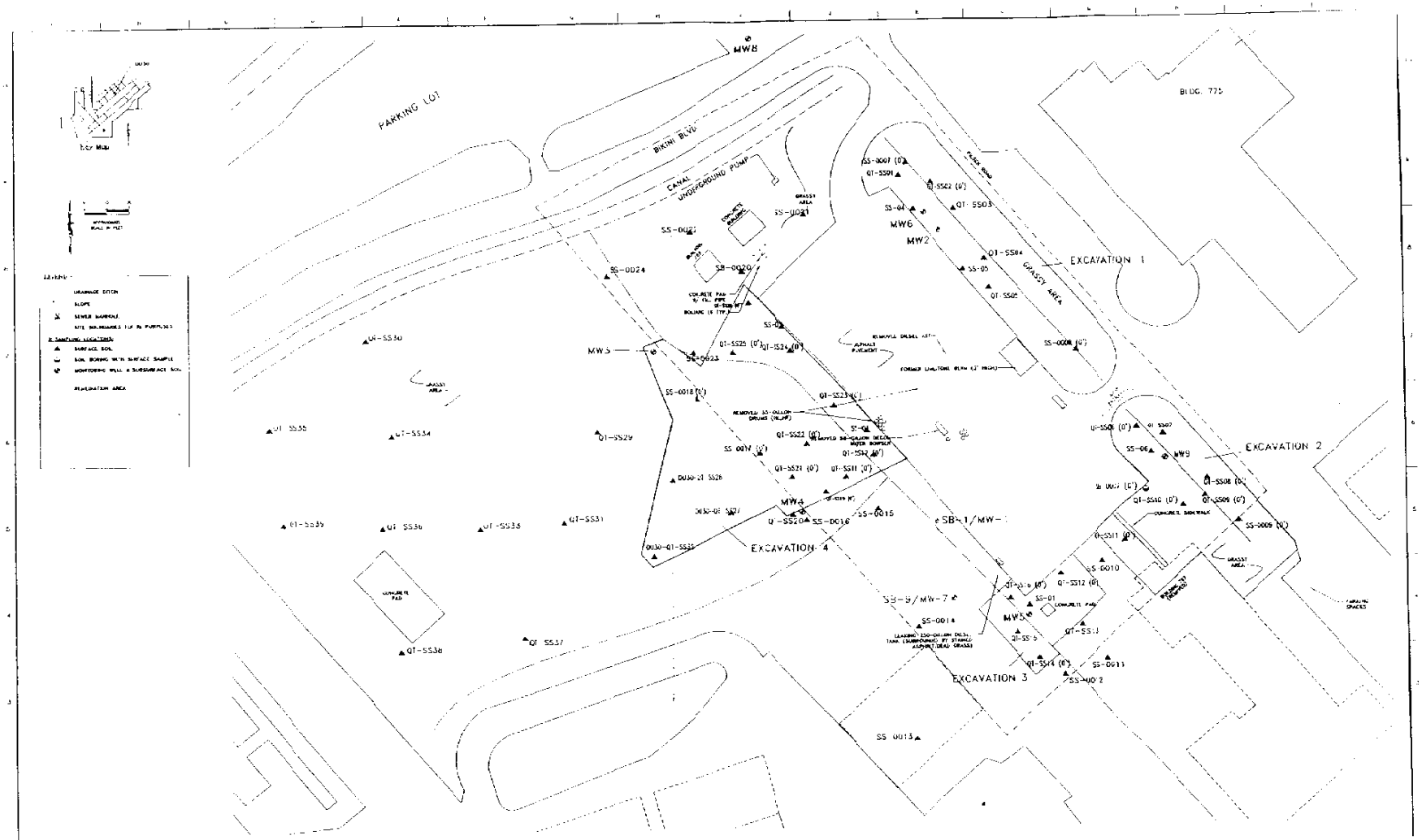
Homestead Air Force Base
Homestead, Florida
Figure # 29
O.U. 28 Remedial Activities Excavation Map



Homestead Air Force Base
Homestead, Florida
Figure # 30
OU 29 Avionics/Aircraft Ground Equipment Maintenance Facility Site Map



Homestead Air Force Base
Homestead, Florida
Figure 5-31
OU 29 Remedial Activities Excavation Map

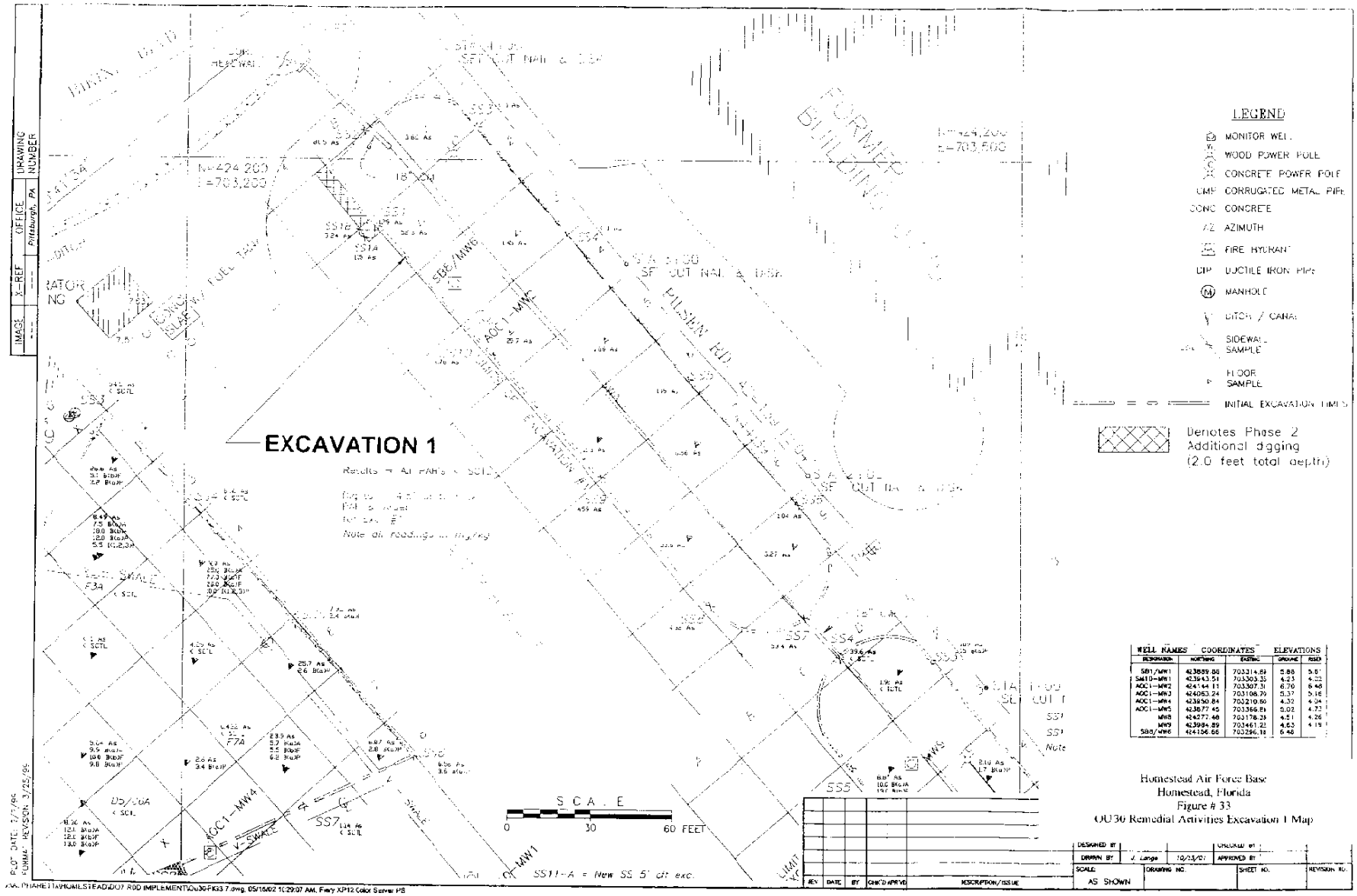


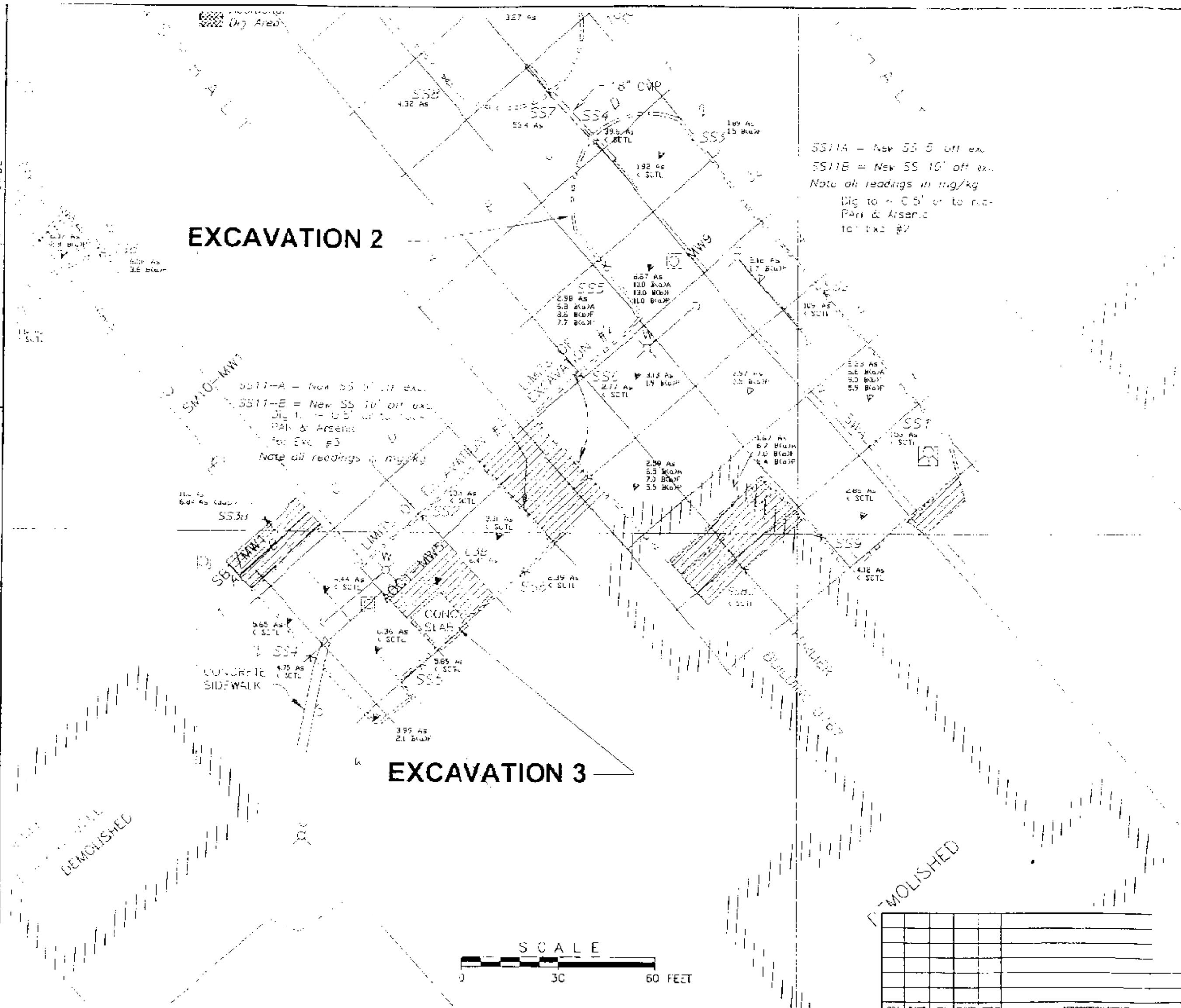
the group	AT FULL SCALE	REVISIONS				
	CADD FILE:	ZONE / REV.	DESCRIPTION	BY	DATE	APP.
	DRAWN: L. SHULMAN					
	DESIGNED:					
	CHECKED:					

FORMER
HOMESTEAD AIR FORCE BASE

PROJECT No. 790992 HOMESTEAD, FLORIDA

Homestead Air Force Base
Homestead, Florida
Figure # 32
OU 5/ Former Building 767 Contractor Storage Area
Site Map


EXCAVATION 1
LEGEND
MONITOR WELL
WOOD POWER POLE
CONCRETE POWER POLE
CMP CORRUGATED METAL PIPE
CONC CONCRETE
AZ AZIMUTH
FIRE HYDRANT
DIP DUCTILE IRON PIPE
MANHOLE
DITCH / CANAL
SIDEWALL SAMPLE
FLOOR SAMPLE
INITIAL EXCAVATION LIMITS
Denotes Phase 2 Additional digging (2.0 feet total depth)
SCALE
0 30 60 FEET
WELL NAMES COORDINATES ELEVATIONS
DESIGNATION NORTHING EASTING GROUND RISER
SB1/MW1 423689.86 703214.84 5.88 5.81
SA10-MW1 423943.51 703303.35 4.23 4.22
AOC1-MW2 424144.11 703307.31 6.70 6.48
AOC1-MW3 424083.24 703106.79 5.37 5.16
AOC1-MW4 423930.84 703210.50 4.32 4.24
AOC1-MW5 423877.45 703366.81 5.02 4.73
MW8 424077.48 703178.35 4.51 4.26
MW9 423984.89 703461.21 4.63 4.19
SB8/MW8 424136.68 703296.18 6.48
Homestead Air Force Base
Homestead, Florida
Figure # 33
OU30 Remedial Activities Excavation 1 Map
DESIGNED BY
DRAWN BY J. Lange 10/23/01
CHECKED BY
APPROVED BY
SCALE AS SHOWN
DRAWING NO.
SHEET NO.
REVISION NO.
REV DATE BY CHK'D APPVD DESCRIPTION/ISSUE
IMAGE
X-REF
OFFICE Pittsburgh, PA
DRAWING NUMBER
PLOT DATE: 1/7/96
FORMAT REVISION: 3/25/96
X:\...\HANETTA\HOMESTEAD\OU7 ROD IMPLEMENT\Ou30-FIG33 7.dwg, 05/16/02 10:29:07 AM, Fiery XP12 Color Server #8



LEGEND

- MONITOR WELL
- WOOD POWER POLE
- CONCRETE POWER POLE
- CMP CORRUGATED METAL PIPE
- CONC CONCRETE
- AZ AZIMUTH
- FIRE HYDRANT
- DIP DUCTILE IRON PIPE
- MANHOLE
- DITCH / CANAL
- SIDEWALL SAMPLE
- FLOOR SAMPLE
- INITIAL EXCAVATION LIMITS

Denotes Phase 2 Additional digging (0.5 feet total depth)

Denotes Phase 3 Additional digging (0.5 feet total depth)

Phase III Excavation in area C3 extended 1.5 feet total depth

WELL NAMES	COORDINATES		ELEVATIONS	
DESIGNATION	NORTHING	EASTING	GROUND	RISER
SB1/MW1	423885.86	703314.8	5.88	5.61
SM10-MW1	423943.51	703303.3	4.23	4.02
AOC1-MW2	424144.11	703307.3	6.70	6.48
AOC1-MW3	424063.24	703108.7	5.37	5.16
AOC1-MW4	423950.84	703210.6	4.32	4.04
AOC1-MW5	423877.45	703366.8	5.02	4.73
MW8	424277.48	703178.3	4.51	4.26
MW9	423984.89	703461.2	4.53	4.19
SB8/MW6	424156.66	703296.1	6.48	

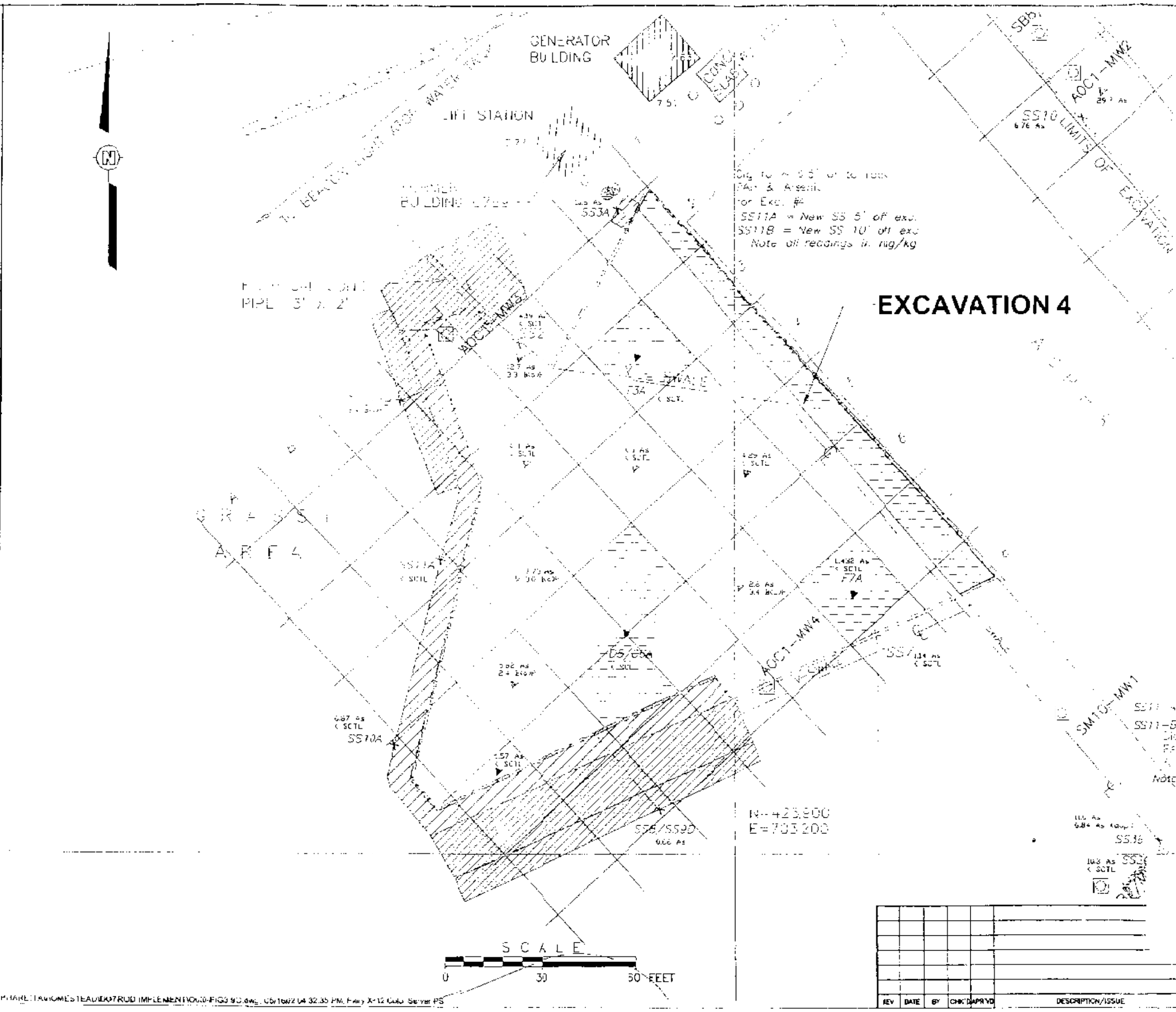
Homestead Air Force Base
Homestead, Florida
Figure # 34
OU 30 Remedial Activities Excavation 2 and 3 Map

REV	DATE	BY	CHK'D/APP'VD	DESCRIPTION/ISSUE

DESIGNED BY		CHECKED BY	
DRAWN BY	J. Lange 10/23/01	APPROVED BY	
SCALE: AS SHOWN	DRAWING NO.	SHEET NO.	REVISION NO.

PLOT DATE: 5/?/95
FORMAT REVISION: 3/25/95

...\HOMESTEAD\OOT R0D IMPLEMENT\Ou30-FIG3.8B.dwg, 05/17/02 10:49:56 AM Fiery XP12 Color Server PS



LEGEND

- MONITOR WELL
- WOOD POWER POLE
- CONCRETE POWER POLE
- CMP CORRUGATED METAL PIPE
- CONC CONCRETE
- AZ AZIMUTH
- FIRE HYDRANT
- DIP DUCTILE IRON PIPE
- MANHOLE
- DITCH / CANAL
- SIDEWALL SAMPLE
- FLOOR SAMPLE
- INITIAL EXCAVATION LIMITS
- Denotes Phase 2 Additional Asphaltic material digging
- Denotes Phase 2 Additional digging (1.0 feet total depth)
- Denotes Phase 2 Additional digging (0.5 feet total depth)
- Denotes Phase 3 Additional digging (0.5 feet total depth)
- Denotes Phase 4 Additional digging (0.5 feet total depth)

WELL NAMES	COORDINATES		ELEVATIONS	
DESIGNATION	NORTHING	EASTING	GROUND	RISER
SB1/MW1	423889.86	703314.89	5.88	5.61
SM10-MW1	423943.51	703303.55	4.23	4.02
AOC1-MW2	424144.11	703307.51	6.70	6.49
AOC1-MW3	424063.24	703108.70	5.37	5.16
AOC1-MW4	423950.84	703210.50	4.32	4.04
AOC1-MW5	423877.45	703368.34	5.02	4.73
MW8	424277.48	703178.33	4.51	4.26
MW9	423984.89	703461.22	4.63	4.15
SB6/MW6	424156.66	703296.18	6.48	6.20

Homestead Air Force Base
Homestead, Florida
Figure # 35
OU 30 Remedial Activities Excavation 4 Map

REV	DATE	BY	CHK'D	APPR'VD	DESCRIPTION/ISSUE

DESIGNED BY		CHECKED BY	
DRAWN BY J. Lange	10/23/01	APPROVED BY	
SCALE: AS SHOWN	DRAWING NO.	SHEET NO.	REVISION NO.

IMAGE	X-REF	OFFICE	DRAWING NUMBER
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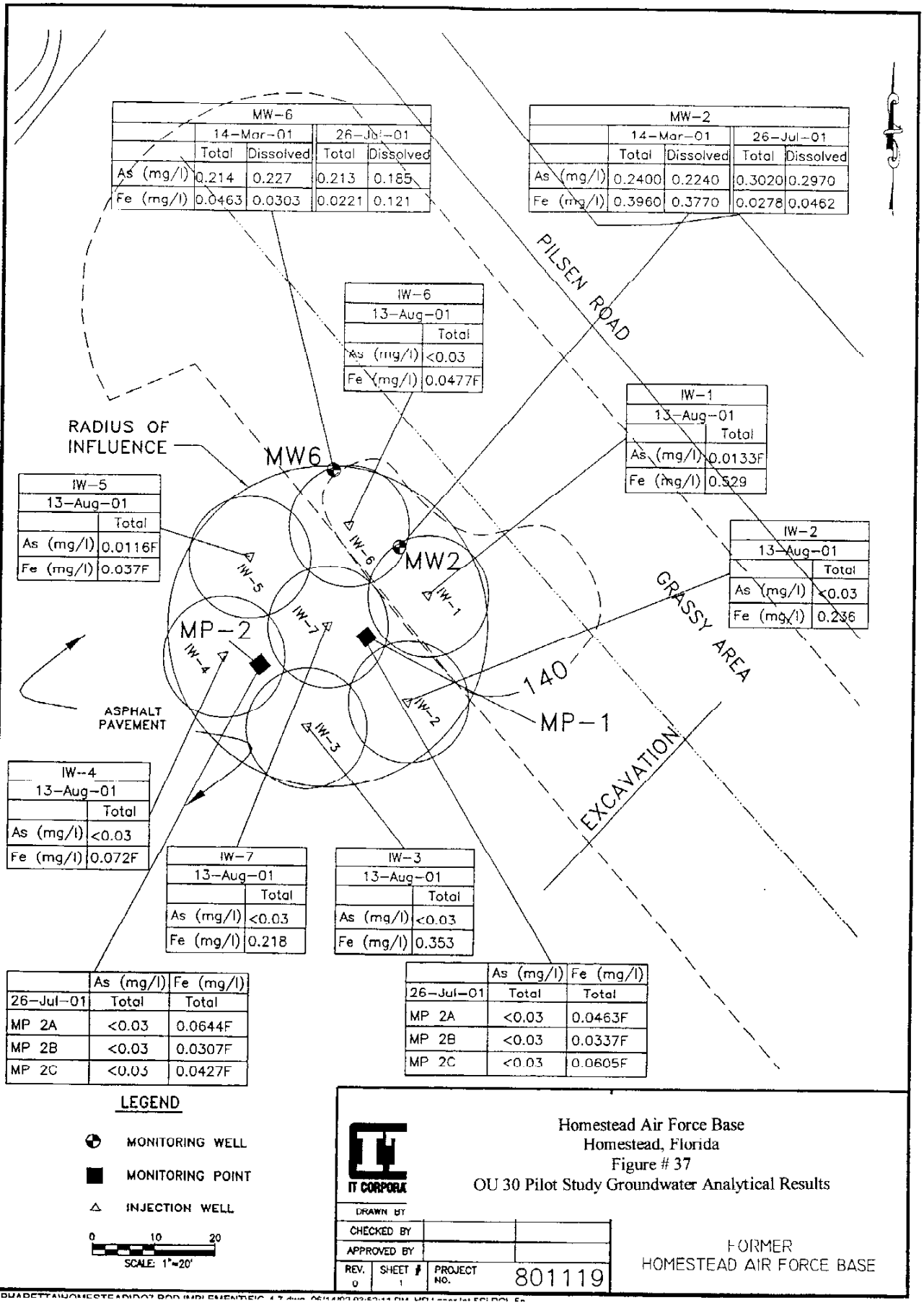
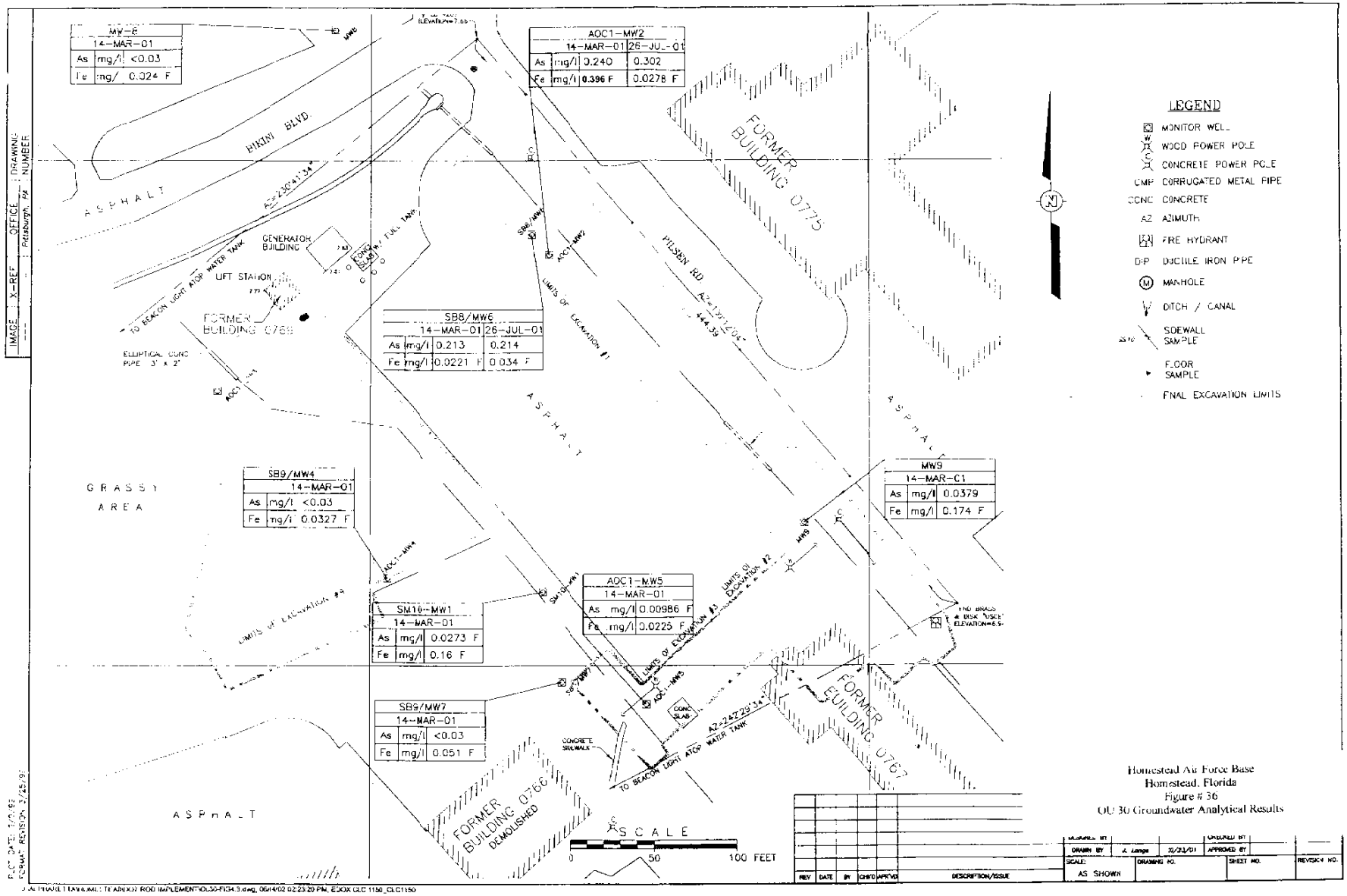
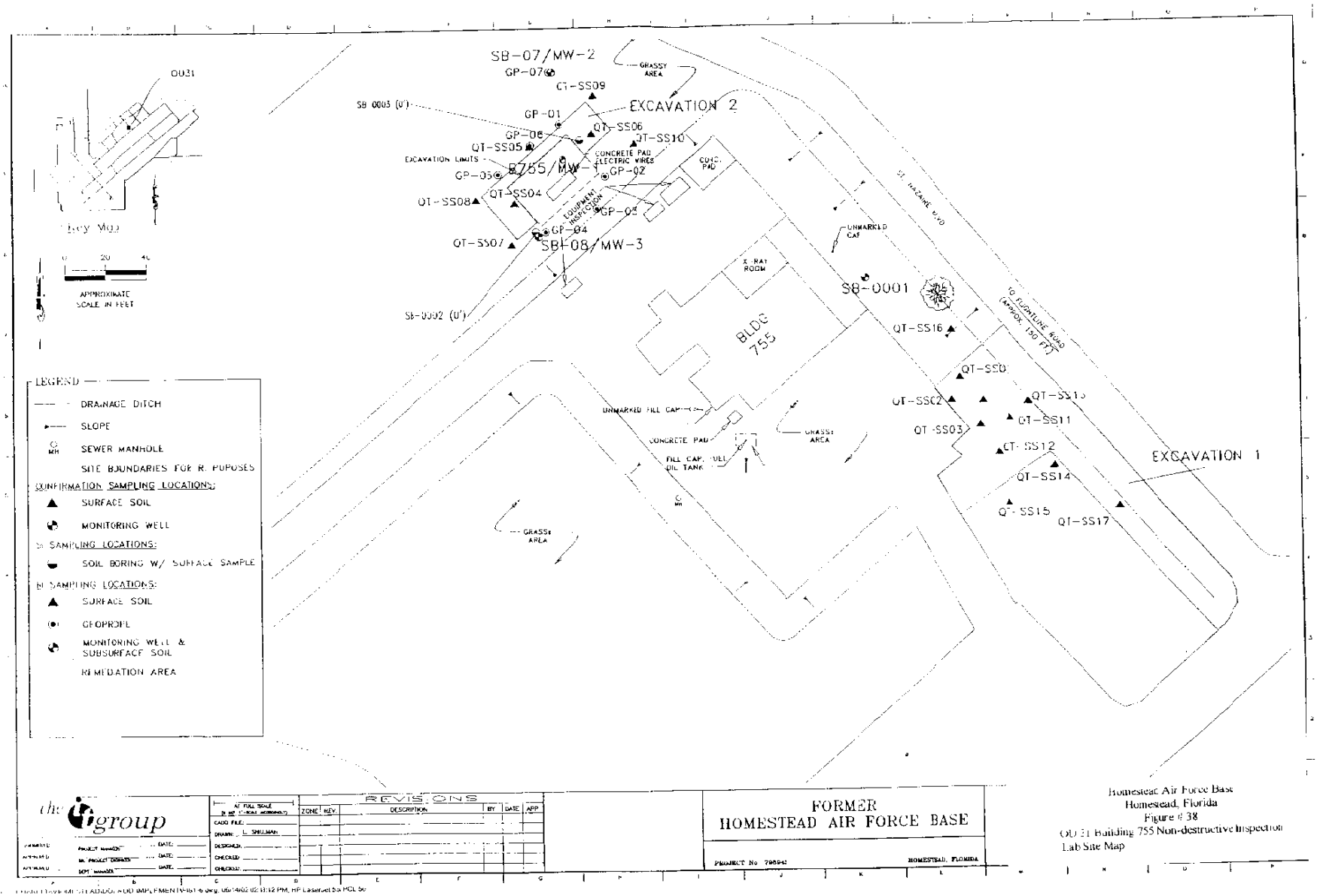
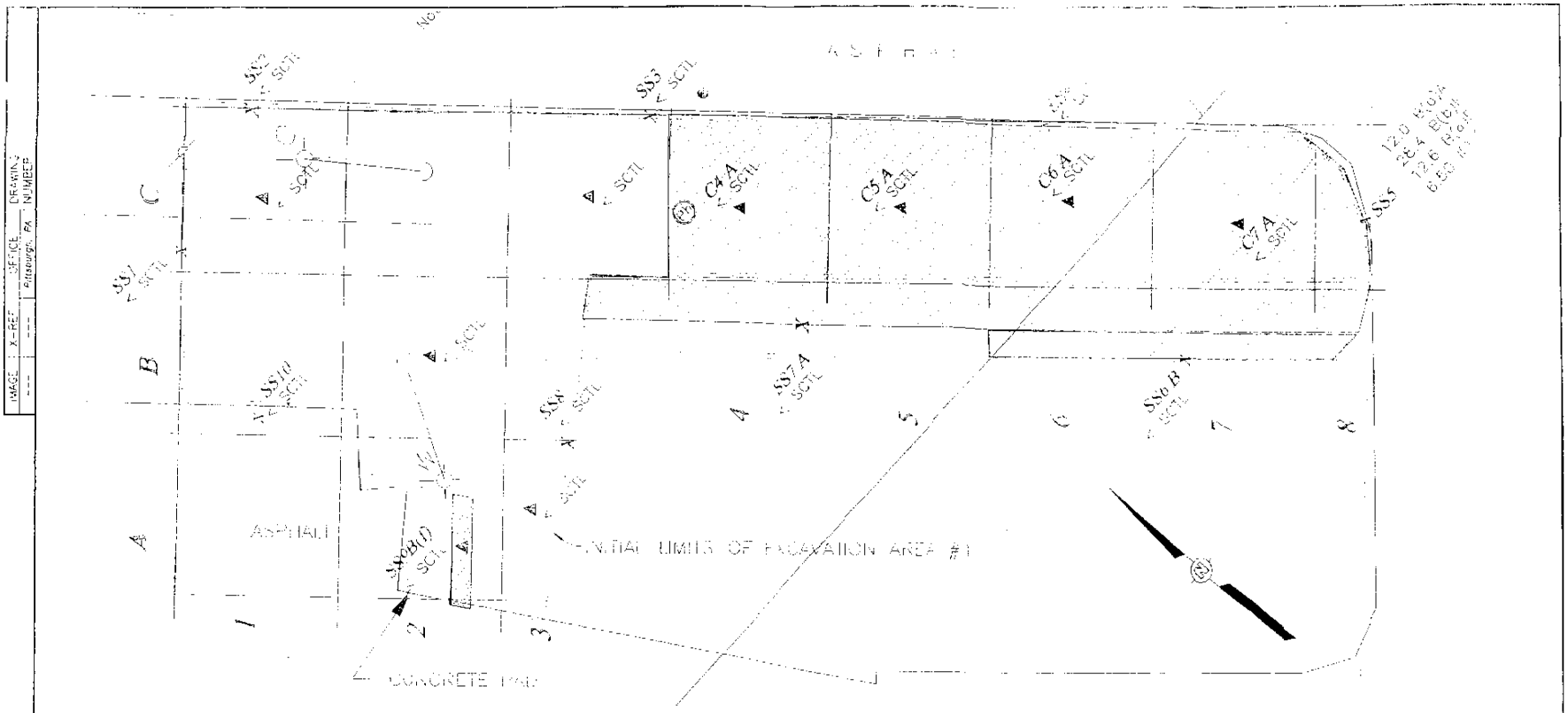
PLOT DATE: 7/7/98
FORMAT REVISION 3/25/98


MW-6
14-Mar-01 Total Dissolved
26-Jul-01 Total Dissolved
As (mg/l) 0.214 0.227 0.213 0.185
Fe (mg/l) 0.0463 0.0303 0.0221 0.121
MW-2
14-Mar-01 Total Dissolved
26-Jul-01 Total Dissolved
As (mg/l) 0.2400 0.2240 0.3020 0.2970
Fe (mg/l) 0.3960 0.3770 0.0278 0.0462
IW-6
13-Aug-01 Total
As (mg/l) <0.03
Fe (mg/l) 0.0477F
IW-1
13-Aug-01 Total
As (mg/l) 0.0133F
Fe (mg/l) 0.529
IW-5
13-Aug-01 Total
As (mg/l) 0.0116F
Fe (mg/l) 0.037F
IW-2
13-Aug-01 Total
As (mg/l) <0.03
Fe (mg/l) 0.236
IW--4
13-Aug-01 Total
As (mg/l) <0.03
Fe (mg/l) 0.072F
IW-7
13-Aug-01 Total
As (mg/l) <0.03
Fe (mg/l) 0.218
IW-3
13-Aug-01 Total
As (mg/l) <0.03
Fe (mg/l) 0.353
As (mg/l) Fe (mg/l)
26-Jul-01 Total Total
MP 2A <0.03 0.0644F
MP 2B <0.03 0.0307F
MP 2C <0.03 0.0427F
As (mg/l) Fe (mg/l)
26-Jul-01 Total Total
MP 2A <0.03 0.0463F
MP 2B <0.03 0.0337F
MP 2C <0.03 0.0605F
PILSEN ROAD
RADIUS OF INFLUENCE
MW6
MW2
MP-2
MP-1
IW-1
IW-2
IW-3
IW-4
IW-5
IW-6
IW-7
GRASSY AREA
140
EXCAVATION
ASPHALT PAVEMENT
LEGEND
MONITORING WELL
MONITORING POINT
INJECTION WELL
0 10 20
SCALE: 1"=20'
IT CORPORA
DRAWN BY
CHECKED BY
APPROVED BY
REV. 0
SHEET # 1
PROJECT NO. 801119
Homestead Air Force Base
Homestead, Florida
Figure # 37
OU 30 Pilot Study Groundwater Analytical Results
FORMER HOMESTEAD AIR FORCE BASE


MW-8
14-MAR-01
As mg/l <0.03
Fe mg/l 0.024 F
AOC1-MW2
14-MAR-01 26-JUL-01
As mg/l 0.240 0.302
Fe mg/l 0.396 F 0.0278 F
SB8/MW6
14-MAR-01 26-JUL-01
As mg/l 0.213 0.214
Fe mg/l 0.0221 F 0.034 F
SB9/MW4
14-MAR-01
As mg/l <0.03
Fe mg/l 0.0327 F
MW9
14-MAR-01
As mg/l 0.0379
Fe mg/l 0.174 F
AOC1-MW5
14-MAR-01
As mg/l 0.00986 F
Fe mg/l 0.0225 F
SM10-MW1
14-MAR-01
As mg/l 0.0273 F
Fe mg/l 0.16 F
SB9/MW7
14-MAR-01
As mg/l <0.03
Fe mg/l 0.051 F
BIKINI BLVD.
PILSEN RD.
FORMER BUILDING 0775
FORMER BUILDING 0768
FORMER BUILDING 0767
FORMER BUILDING 0766 DEMOLISHED
GENERATOR BUILDING
LIFT STATION
TO BEACON LIGHT ATOP WATER TANK
ELLIPTICAL CONC PIPE 3' x 2'
CONC SLAB
CONCRETE SIDEWALK
LIMITS OF EXCAVATION #1
LIMITS OF EXCAVATION #2
LIMITS OF EXCAVATION #3
ASPHALT
GRASSY AREA
SCALE
0 50 100 FEET
LEGEND
MONITOR WELL
WOOD POWER POLE
CONCRETE POWER POLE
CMP CORRUGATED METAL PIPE
CONC CONCRETE
AZ AZIMUTH
FIRE HYDRANT
DIP DUCTILE IRON PIPE
MANHOLE
DITCH / CANAL
SIDEWALL SAMPLE
FLOOR SAMPLE
FINAL EXCAVATION LIMITS
N
Homestead Air Force Base
Homestead, Florida
Figure # 36
OU 30 Groundwater Analytical Results
DRAWN BY J. Lange 10/23/01
SCALE: AS SHOWN
DRAWING NO.
SHEET NO.
REVISION NO.
REV DATE BY CHK'D APPVD DESCRIPTION/ISSUE



Homestead Air Force Base
Homestead, Florida
Figure # 38
OU 11 Building 755 Non-destructive Inspection
Lab Site Map



LEGEND

- MONITOR WELL
- WOOD POWER POLE
- CONCRETE POWER POLE
- CMP — CORRUGATED METAL PIPE
- CONC. — CONCRETE
- FIRE HYDRANT
- TELEPHONE MANHOLE
- DITCH / CANAL
- SS10 — SIDEWALL SAMPLE
- C4A — FLOOR SAMPLE
- INITIAL EXCAVATION LIMITS

Denotes Phase 4 Additional digging (2.0 total depth)

Denotes Phase 3 Additional digging (1.5 total depth)

Denotes Phase 2 Additional digging (1.5 feet total depth)

SCALE
0 20 40 FEET

Homestead Air Force Base
Homestead, Florida
Figure # 39
OU31 Remedial Activities Excavation Map

REV	DATE	BY	CHK'D/APP'VD	DESCRIPTION/ISSUE

DRAWN BY	J. Lange	4/8/98	APPROVED BY	
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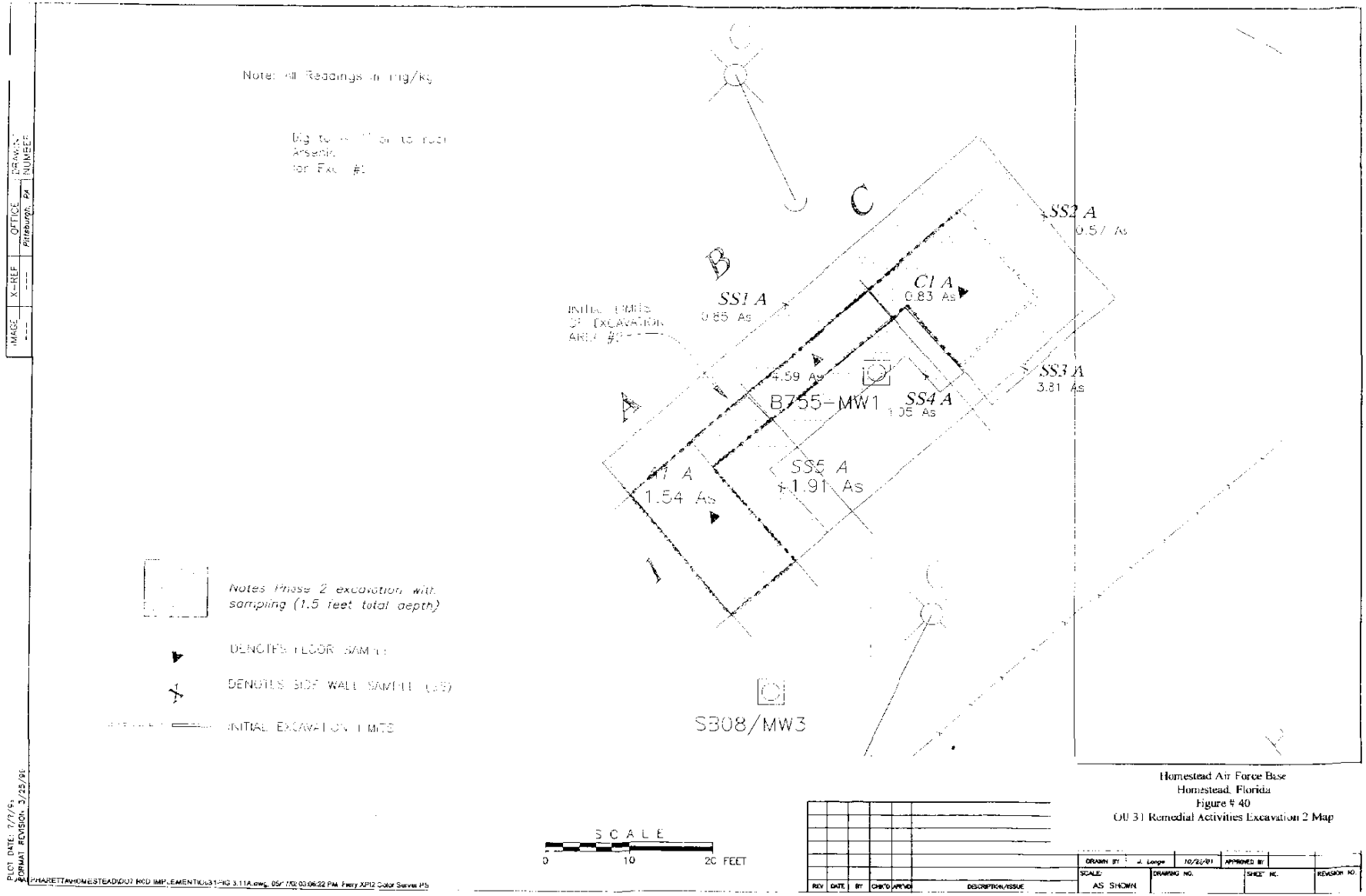
IMAGE | X-REFS | OFFICE Pittsburgh, PA | DRAWING NUMBERS

PLOT DATE: 7/7/98
FORMAT REVISION 3/25/96

J:\ALPHARET\AHOMESTEAD\OU7 FOD IMPLEMENT\OU31-FIG3.10C.dwg, 05/15/02 03:56:39 PM, Fiery XP12 Color Server PS



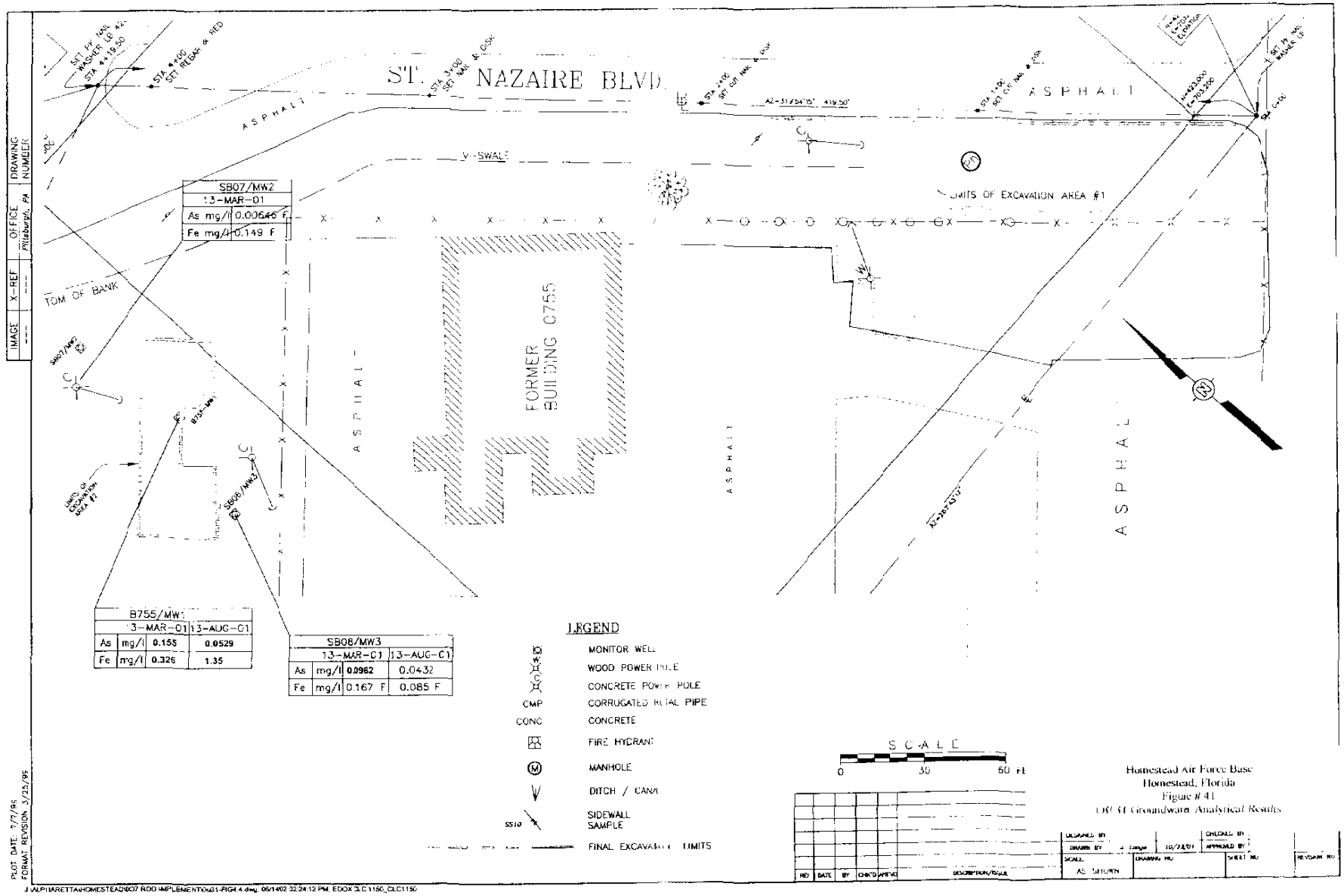
Homestead Air Force Base
Homestead, Florida
Figure # 40
OU 31 Remedial Activities Excavation 2 Map

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Pittsburgh, PA	

REV	DATE	BY	CHK'D	APV'D	DESCRIPTION/ISSUE

DRAWN BY: J. Lange 10/22/01 APPROVED BY:
SCALE: AS SHOWN DRAWING NO. SHEET NO. REVISION NO.

PLOT DATE: 1/1/96
FORMAT REVISION: 3/25/96
P:\HARETTA\HOMESTEAD\DO7 ROD IMPLEMENTIO\31-FIG 3.11A.dwg, 05/1/02 03:06:22 PM, Fiery XP12 Color Server, P5



Homestead Air Force Base
Homestead, Florida
Figure # 4-1
UST 61 Groundwater Analytical Results

IMAGE --- X-REF --- OFFICE Pittsburgh, PA DRAWING NUMBER

PLOT DATE: 7/7/95
FORMAT REVISION 3/25/95

J:\ALP\HARETTA\HOMESTEAD\807 ROD IMPLEMENTATION\81-FIG4-4.dwg 06/14/02 12:24:12 PM EDOX SLC1150_CLC1150

TABLES

TABLE 1

HISTORY OF BASE OPERATIONS

Period	Types of Operations	Weapon Systems	General Industrial Activities
Pre-1940	Open space, native	None	None
1940–1944	Pan American Air Ferries, Inc.	None	Aircraft maintenance
1942–1944	Air Transport Command (ATC) Army Air Field	N/A	None
	2nd Operational Training Unit (OTU)	None	Electroplating waste disposal
1945–1952	Hurricane damaged base; placed on inactive status	Base activities ceased early 1950s	Aircraft maintenance
	Property turned over to Dade County		Hardfills, crop duster maintenance
1953–1955	Federal government again acquired property and rebuilt base	N/A	General construction work
1955–1961	Base reactivated as Homestead AFB Strategic Air Command	N/A B-47, B-52 bombers	Drum storage, pesticide usage, landfills, USTs, FPTAs, jet fuel services, sewage sludge disposal, and aircraft maintenance and painting

TABLE 1 (CONTINUED)

HISTORY OF BASE OPERATIONS

Period	Types of Operations	Weapon Systems	General Industrial Activities
1970–1980	Tactical Fighter Wing	F-4 Hawk Missile Site	Drum storage, pesticide usage, landfills, USTs, FPTAs, jet fuel services, sewage sludge disposal, and aircraft maintenance and painting
1981–1984	Tactical Training Wing	F-4	Drum storage, pesticide usage, landfills, USTs, FPTAs, jet fuel services, and FPTAs
1985–1986	Tactical Fighter Wing	F-16 Falcon	Drum storage, pesticide usage, landfills, USTs, FPTAs, jet fuel services, and FPTAs
1987–1992	Tactical Air Command 31st Fighter Wing 31st Fighter Wing	N/A F-16 Falcon F-16 C/D Aircraft	Drum storage, pesticide usage, landfills, USTs, FPTAs, jet fuel services, and FPTAs
Aug. 1992	Hurricane Andrew damaged base	N/A	Base facilities sustained major damage
Mar. 1994	Base realigned; 482 Fighter Wing resumes flight operations	F-16 C/D aircraft	Aircraft maintenance and painting, fuel storage, pesticide usage, vehicle maintenance, drum storage

Table 2
OU 18
Groundwater
Analytical Results

					Sample Location		OU18-MW1R		OU18-MW1R		OU18-MW1R		OU18-MW1R		OU18-MW1R	
					Sample Event		Y1SA1		Y1SA2		Y2SA1		Y2SA2		Y3SA1		Y3SA2	
					Sample Date		26-Oct-99		12-Apr-00		16-Oct-00		25-Apr-01		22-Oct-01		24-Apr-02	
					Unique ID Number		910841		04294-01		200758-01		L0104539-01		L0110466-01		CY3SA23000	
Parameter	Units	GCTL[b]	FSWC[b]	MDL[b]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Volatiles Organic Compounds																
Acetone	µg/L	700	1692	2.5	na		na		-		-		-		-	
Semivolatiles Organic Compounds																
Carbazole	µg/L	4	46.5	2.85	na		na		-		-		-		-	
Dichlorobenzidine, 3,3'-	µg/L	12	0.06	2.5	na		na		-		-		-	R	-	
Polynuclear Aromatic Hydrocarbons																
Acenaphthene	µg/L	20	3	0.05	5		3.68	J	4.7		1.1		0.73		0.205	
Acenaphthylene	µg/L	210	0.031	0.05	2		-	R	-		-		-	R	-	
Anthracene	µg/L	2100	0.3	0.05	2		-		0.58		-		-	R	-	
Benzo(a)anthracene	µg/L	0.2	0.031	0.05	-		0.183	F	0.052		0.09	F	0.4	M	-	
Benzo(a)pyrene	µg/L	0.2	0.031	0.05	1.6		-		-		-		0.29	M	-	
Benzo(b)fluoranthene	µg/L	0.2	0.031	0.05	-		0.188	F	-		-		0.36	M	-	
Benzo(g,h,i)perylene	µg/L	210	0.031	0.05	-		-		-		-		0.23	J	-	
Benzo(k)fluoranthene	µg/L	0.5	0.031	0.05	-		0.078	F	-		-		0.2	M	-	
Chrysene	µg/L	4.8	0.031	0.05	3.3		-		0.047	J	0.09	F	0.42	M	-	
Dibenzo(a,h)anthracene	µg/L	0.2	0.031	0.05	2		-		-		-		-	R	-	
Fluoranthene	µg/L	280	0.3	0.05	2		1.84		2.6		1.8		2.2	M	0.791	
Fluorene	µg/L	280	30	0.05	2		4.32	J	4.2		1.4		0.3	J	0.140	
Indeno(1,2,3-cd)Pyrene	µg/L	0.2	0.031	0.05	-		-		-		-		0.19	J	-	
Methylnaphthalene, 1-	µg/L	20	95	0.05	6		na		-		-		-	R	-	
Methylnaphthalene, 2-	µg/L	20	30	0.05	6		na		-		-		-		-	
Naphthalene	µg/L	20	26	0.05	7		1.17	J	-		-		-		-	
Phenanthrene	µg/L	210	0.031	0.05	4		0.974	F	-		-		-	R	-	
Pyrene	µg/L	210	0.3	0.05	2		1.13		1.5		1.2		1.7	M	0.532	
Pesticides																
Aldrin	µg/L	0.005	3	0.01	na		na		-		-		-		-	
Chlordane[a]	µg/L	2	0.0043	0.25	na		na		-		-		-		-	
DDE, 4,4'-	µg/L	0.1	0.1	0.025	na		na		-		-		-		-	
Dieldrin	µg/L	0.005	0.0019	0.025	na		na		-		-		-		-	
Heptachlor epoxide	µg/L	0.2	0.002	0.01	na		na		-		-		-		-	
Methoxychlor	µg/L	40	0.03	0.025	na		na		-		-		-		-	
Metals																
Antimony	mg/l	0.006	4.3	0.0005	na		na		-		-		-		-	
Chromium	mg/l	0.1	NS	0.00057	na		na		-		0.00075	F	0.0074	F	-	
Iron	mg/l	0.3	1	0.0133	na		na		6.81		3.72		3.72		1.06	
Manganese	mg/l	0.05	NS	0.00021	na		na		0.295		0.0772		0.0511		0.0241	
General Chemistry																
Ammonia	mg/l	2.8	0.02	0.06	1.1		1.9		2.36		0.89		0.47		0.736	

Table 2
OU 18
Groundwater
Analytical Results

					Sample Location		OU18-MW2R		OU18-MW2R		OU18-MW2R		OU18-MW2RA		OU18-MW2RA		OU18-MW2RA	
					Sample Event		Y1SA1		Y1SA2		Y2SA1		Y2SA2		Y3SA1		Y3SA2	
					Sample Date		26-Oct-99		12-Apr-00		16-Oct-00		24-Apr-01		22-Oct-01		24-Apr-02	
					Unique ID Number		910841		04294-03		200758-03		L0104539-02		L0110466-04		CY3SA23001	
Parameter	Units	GCTL[b]	FSWC[b]	MDL[b]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Volatiles Organic Compounds																		
Acetone	µg/L	700	1692	2.5	na		na		10		-		2.71	F	-			
Semivolatiles Organic Compounds																		
Carbazole	µg/L	4	46.5	2.85	na		na		34		2.49	F	3.08	F	-			
Dichlorobenzidine, 3,3'-	µg/L	12	0.06	2.5	na		na		-		-		-		-			
Polynuclear Aromatic Hydrocarbons																		
Acenaphthene	µg/L	20	3	0.05	25		17.3	J	22		0.89	F	3.2		0.106	F		
Acenaphthylene	µg/L	210	0.031	0.05	19		-	R	-		0.1	M	-	R	-			
Anthracene	µg/L	2100	0.3	0.05	9		7.42	J	7.5		0.36		1.8	J	-			
Benzo(a)anthracene	µg/L	0.2	0.031	0.05	1.1		4.51		1.5		0.61		2.8		0.478			
Benzo(a)pyrene	µg/L	0.2	0.031	0.05	0.8		4.12		0.95		0.06	F	2		0.0581	F		
Benzo(b)fluoranthene	µg/L	0.2	0.031	0.05	0.8		4.72		1.2		0.09	F	2.2		0.0984	F		
Benzo(g,h,i)perylene	µg/L	210	0.031	0.05	0.8		3.49		-		-		1.3	J	-			
Benzo(k)fluoranthene	µg/L	0.5	0.031	0.05	0.3		1.93		0.183	F	0.08	F	1.4		0.0786	F		
Chrysene	µg/L	4.8	0.031	0.05	0.9	F	3.39		-		0.52		2.6		0.497			
Dibenzo(a,h)anthracene	µg/L	0.2	0.031	0.05	0.5		-		-		-		-	R	-			
Fluoranthene	µg/L	280	0.3	0.05	12		16.4	J	15		7.9		12	J	3.93			
Fluorene	µg/L	280	30	0.05	17		29.6	J	23		2	M	6	J	0.196			
Indeno(1,2,3-cd)Pyrene	µg/L	0.2	0.031	0.05	0.3		2.89		0.63		-		1.2	J	-			
Methylnaphthalene, 1-	µg/L	20	95	0.05	45		na		36		-		0.25	J	-			
Methylnaphthalene, 2-	µg/L	20	30	0.05	44		na		-		-		0.29		-			
Naphthalene	µg/L	20	26	0.05	110		63.5	J	55		0.08	F	0.96		-			
Phenanthrene	µg/L	210	0.031	0.05	28		54		35		2.6	M	4.3	J	-			
Pyrene	µg/L	210	0.3	0.05	10		11.7	J	6.8		5.9		9.2		3.52			
Pesticides																		
Aldrin	µg/L	0.005	3	0.01	na		na		-		-		-		-			
Chlordane[a]	µg/L	2	0.0043	0.25	na		na		-		-		-		-			
DDE, 4,4'-	µg/L	0.1	0.1	0.025	na		na		-		-		-		-			
Dieldrin	µg/L	0.005	0.0019	0.025	na		na		-		-		-		-			
Heptachlor epoxide	µg/L	0.2	0.002	0.01	na		na		-		-		-		-			
Methoxychlor	µg/L	40	0.03	0.025	na		na		-		-		-		-			
Metals																		
Antimony	mg/l	0.006	4.3	0.0005	na		na		0.303	B	-		-		-			
Chromium	mg/l	0.1	NS	0.00057	na		na		0.0343		-		0.00268	F	-			
Iron	mg/l	0.3	1	0.0133	na		na		34		1.01		2.36		0.544			
Manganese	mg/l	0.05	NS	0.00021	na		na		0.971		0.0346		0.135		0.0529			
General Chemistry																		
Ammonia	mg/l	2.8	0.02	0.06	3.2		6.4		5.88		0.66		2.50		1.07			

Table 2
OU 18
Groundwater
Analytical Results

Parameter	Units	GCTL[b]	FSWC[c]	MDL[b]	Sample Location	OU18-MW3R	OU18-MW3R	OU18-MW3R	OU18-MW3R	OU18-MW3R	OU18-MW3R
					Sample Event	Y1SA1	Y1SA2	Y2SA1	Y2SA2	Y3SA1	Y3SA2
					Sample Date	26-Oct-99	12-Apr-00	16-Oct-00	25-Apr-01	22-Oct-01	25-Apr-02
					Unique ID Number	910841	04294-05	200758-06	L0104539-05	L0110466-06	CY3SA23002
						Result Qual	Result Qual	Result Qual	Result Qual	Result Qual	Result Qual
Volatiles Organic Compounds											
Acetone	µg/L	**700**	1692	2.5	na		na	9 J	-	-	-
Semivolatiles Organic Compounds											
Carbazole	µg/L	**4**	46.5	2.85	na		na	-	-	-	-
Dichlorobenzidine, 3,3'-	µg/L	12	0.06	**2.5**	na		na	-	-	-	-
Polynuclear Aromatic Hydrocarbons											
Acenaphthene	µg/L	20	**3**	0.05	2		0.983 R	-	-	-	-
Acenaphthylene	µg/L	210	0.031	**0.05**	1		- R	-	-	- R	-
Anthracene	µg/L	2100	**0.3**	0.05	**0.5** F		-	-	-	- R	-
Benzo(a)anthracene	µg/L	0.2	0.031	**0.05**	**0.2**		**0.134** F	-	-	-	-
Benzo(a)pyrene	µg/L	0.2	0.031	**0.05**	**0.16** F		**0.152** F	-	-	-	-
Benzo(b)fluoranthene	µg/L	0.2	0.031	**0.05**	-		**0.169** F	-	-	-	-
Benzo(g,h,i)perylene	µg/L	210	0.031	**0.05**	-		-	-	-	- R	-
Benzo(k)fluoranthene	µg/L	0.5	0.031	**0.05**	-		-	-	-	-	-
Chrysene	µg/L	4.8	0.031	**0.05**	-		-	-	-	-	-
Dibenzo(a,h)anthracene	µg/L	0.2	0.031	**0.05**	-		-	-	-	- R	-
Fluoranthene	µg/L	280	**0.3**	0.05	**0.8** F		**0.633**	0.18	**0.33**	-	0.220
Fluorene	µg/L	280	**30**	0.05	0.8 F		0.744 J	0.053 J	-	- R	-
Indeno(1,2,3-cd)Pyrene	µg/L	0.2	0.031	**0.05**	-		-	-	-	- R	-
Methylnaphthalene, 1-	µg/L	**20**	95	0.05	-		na	-	-	- R	-
Methylnaphthalene, 2-	µg/L	**20**	30	0.05	2		na	-	-	-	-
Naphthalene	µg/L	**20**	26	0.05	3		- R	-	-	-	-
Phenanthrene	µg/L	210	0.031	**0.05**	**1**		**0.542** F	0.041 J	-	- R	-
Pyrene	µg/L	210	**0.3**	0.05	**0.5** F		**0.432**	0.096	0.21	-	0.100 F
Pesticides											
Aldrin	µg/L	0.005	3	**0.01**	na		na	-	-	-	-
Chlordane[a]	µg/L	2	0.0043	**0.25**	na		na	-	-	-	-
DDE, 4,4'-	µg/L	**0.1**	0.1	0.025	na		na	-	-	-	-
Dieldrin	µg/L	0.005	0.0019	**0.025**	na		na	-	-	-	-
Heptachlor epoxide	µg/L	0.2	0.002	**0.01**	na		na	-	-	-	-
Methoxychlor	µg/L	40	**0.03**	0.025	na		na	-	-	-	-
Metals											
Antimony	mg/l	**0.006**	4.3	0.0005	na		na	0.0041 B	-	-	-
Chromium	mg/l	**0.1**	NS	0.00057	na		na	-	-	0.00115 F	-
Iron	mg/l	**0.3**	1	0.0133	na		na	0.163	0.138 F	0.0856 F	0.119 F
Manganese	mg/l	**0.05**	NS	0.00021	na		na	0.0095 B	0.0196	0.00541	0.0143
General Chemistry											
Ammonia	mg/l	2.8	0.02	**0.06**	0.06		**0.46**	**0.42**	**0.2**	-	**0.170**

Table 2
OU 18
Groundwater
Analytical Results

					Sample Location		OU18-MW4R		OU18-MW4R		OU18-MW4R		OU18-MW4R		OU18-MW4R		OU18-MW4R	
					Sample Event		Y1SA1		Y1SA2		Y2SA1		Y2SA2		Y3SA1		Y3SA2	
					Sample Date		26-Oct-99		12-Apr-00		16-Oct-00		24-Apr-01		22-Oct-01		25-Apr-02	
					Unique ID Number		910841		04294-06		200758-04		L0104539-07		L0110466-07		CY3SA23003	
Parameter	Units	GCTL[b]	FSWC[b]	MDL[b]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Volatiles Organic Compounds																		
Acetone	µg/L	700	1692	2.5	na		na		14		-		-		-			
Semivolatiles Organic Compounds																		
Carbazole	µg/L	4	46.5	2.85	na		na		-		-		-		-			
Dichlorobenzidine, 3,3'-	µg/L	12	0.06	2.5	na		na		-		-		-	R	-			
Polynuclear Aromatic Hydrocarbons																		
Acenaphthene	µg/L	20	3	0.05	1		1.54	R	-		-		-		-			
Acenaphthylene	µg/L	210	0.031	0.05	3		-	R	-		-		-	R	-			
Anthracene	µg/L	2100	0.3	0.05	0.4	F	-		-		-		-	R	-			
Benzo(a)anthracene	µg/L	0.2	0.031	0.05	-		0.155	F	-		-		-		-			
Benzo(a)pyrene	µg/L	0.2	0.031	0.05	-		-		-		-		-		-			
Benzo(b)fluoranthene	µg/L	0.2	0.031	0.05	-		-		-		-		-		-			
Benzo(g,h,i)perylene	µg/L	210	0.031	0.05	-		-		-		-		-	R	-			
Benzo(k)fluoranthene	µg/L	0.5	0.031	0.05	-		-		-		-		-		-			
Chrysene	µg/L	4.8	0.031	0.05	-		-		-		-		-		-			
Dibenzo(a,h)anthracene	µg/L	0.2	0.031	0.05	-		-		-		-		-	R	-			
Fluoranthene	µg/L	280	0.3	0.05	0.9	F	1.58		-		0.2		-		0.0730	F		
Fluorene	µg/L	280	30	0.05	0.5	F	1.92	M	-		-		-	R	-			
Indano(1,2,3-cd)Pyrene	µg/L	0.2	0.031	0.05	-		-		-		-		-	R	-			
Methylnaphthalene, 1-	µg/L	20	95	0.05	-		na		-		-		-	R	-			
Methylnaphthalene, 2-	µg/L	20	30	0.05	3		na		-		-		-		-			
Naphthalene	µg/L	20	26	0.05	6		0.694	R	-		-		-		-			
Phenanthrene	µg/L	210	0.031	0.05	0.9	F	0.815	F	-		-		-	R	-			
Pyrene	µg/L	210	0.3	0.05	0.5	F	1		-		0.13		-		-			
Pesticides																		
Aldrin	µg/L	0.005	3	0.01	na		na		-		-		-		-			
Chordane[a]	µg/L	2	0.0043	0.25	na		na		-		0.070	F	0.19	F	-			
DDE, 4,4'-	µg/L	0.1	0.1	0.025	na		na		0.068	P	0.063	F	0.0504	F	-			
Dieldrin	µg/L	0.005	0.0019	0.025	na		na		-		-		-		-			
Heptachlor epoxide	µg/L	0.2	0.002	0.01	na		na		0.043	P	-		-		-			
Methoxychlor	µg/L	40	0.03	0.025	na		na		-		-		-		-			
Metals																		
Antimony	mg/l	0.006	4.3	0.0005	na		na		0.0031	B	-		-		-			
Chromium	mg/l	0.1	NS	0.00057	na		na		-		-		0.00355	F	-			
Iron	mg/l	0.3	1	0.0133	na		na		0.194		0.285		0.281	J	0.702	J		
Manganese	mg/l	0.05	NS	0.00021	na		na		0.084		0.0115		0.00593		0.0293			
General Chemistry																		
Ammonia	mg/l	28	0.02	0.06	1.6		3.6		.1		0.41		0.180		0.610			

Table 3
OU-20 Groundwater Analytical Results

	Sample ID		B618-MW-0001			OU20-MW-0002		OU20-MW-0003		FAC Chapter
	Event		Y1SA1	Overpumping	PRAY1SA1	Y1SA1	PRAY1SA1	Y1SA1	PRAY1SA1	62-777
	Laboratory ID No.		L0103348-01	L0108340-06	L0111004-03	L0103348 02	L0111004-04	L0103348 04	L0111004-01	GCTLs
	Sample Date		12-Mar-01	14-Aug 01	29-Oct-01	12-Mar-01	29-Oct 01	12-Mar-01	29-Oct-01	
	Depth To Water At Sampling (ft, BTC)		5.68	5.25	4 53	5 33	5.00	4.94	5.49	
	Temperature (C)		24 9	26 53	26 74	24 95	26 79	26 03	27.3'	
	Conductivity (uS/cm)		462	448	457	376	351	584	571	
	pH (SU)		7 01	7.05	7.00	7 28	7 38	7 01	6 97	
	Turbidity (NTU)		0 4	3.2	<10	5 1	5.1	7 1	9	
	Dissolved Oxygen (mg/l		3 2	1.3	0.86	42 3	3.85	3 3	0 44	
	Chloride (mg/l		60	100	40	60	60	40	40	
	ORP (mV)		-94 9	73.1	-8.8	35 6	225.5	-5.4	44.7	
	Iron II (mg/l		<0 2	<0 2	<2	<0.2	<2	0.6	<2	
LABORATORY ANALYSES	RL	Units								
Metals by SW-846 Method 6010B										
Arsenic	0.03	mg/L	0.0726	0.108	0.0797	0.00683 F	<0.03	<0.03	<0.03	0.05
Iron	0.2	mg/l	0.0837 F	0.246	0.0398 F	0.039 F	0.0296 F	0.187 F	0.0729 F	0.3
Date Analyzed			*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	*22 Mar-01*	*7-Nov-01*	*22-Mar-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series										
Alkalinity	10	mg/L	220	250	214	180	147	240	269	NS
Date Analyzed			*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	*19 Mar-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

Concentration exceeds the FDEP Groundwater Cleanup Target Goal

F = the analyte was positively identified but the associated numerical values is below the RL and above the MDL

NA= not analyzed

NS= no standard

Table 4
OU-21 Groundwater Analytical Results

			Sample ID	OU21-MW-0001			OU21-MW-0002			FAC Chapter
			Event	Y1SA1	Overpumping	PRAY1SA1	Y1SA1	Overpumping	PRAY1SA1	62-777
			Laboratory ID No.	L0103348-06	L0108340-03	L0111004-06	L0103348-07	L0108340-01	L0111005-05	GCTLs
			Sample Date	13-Mar-01	14-Aug-01	29-Oct-01	13-Mar-01	14-Aug-01	30-Oct-01	
			Depth To Water At Sampling (ft, BTC)	5.03	5.09	4.69	3.62	3.61	3.28	
			Temperature (C)	24.91	25.67	25.85	24.9	25.76	25.94	
			Conductivity (uS/cm)	507	455	501	457	451	452	
			pH (SU)	7.19	7.31	7.21	7.26	7.34	7.36	
			Turbidity (NTU)	0.2	2.6	0	4.6	0	0	
			Dissolved Oxygen (mg/l)	3.8	5.24	3.79	2.6	6.65	4.26	
			Chloride (mg/l)	60	100	80	80	120	80	
			ORP (mV)	154.2	161.3	277	126.1	157.7	234.1	
			Iron II (mg/l)	<0.2	<0.2	<2	0.4	<0.2	<2	
LABORATORY ANALYSES	RL	Units								
Metals by SW-846 Method 6010B										
Arsenic	0.03	mg/l		**0.171**	**0.165**	**0.158**	**0.255**	**0.212**	**0.288**	0.05
Iron	0.2	mg/L		**0.0423 F**	**0.0231 J**	**0.0268 F**	**0.0774 F**	**0.0178 F**	**0.0772 F**	0.3
Date Analyzed				*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series										
Alkalinity	10	mg/L		**190**	**190**	**192**	**180**	**170**	**173**	NS
Date Analyzed				*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	

			Sample ID	OU21-MW-0003		OU21-MW-0004		FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	PRAY1SA1	62-777
			Laboratory ID No.	L0103348-08	L0111004-07	L0103348-05	L0111004-05	GCTLs
			Sample Date	13-Mar-01	29-Oct-01	12-Mar-01	29-Oct-01	
			Depth To Water At Sampling (ft, BTC)	5.74	5.43	5.77	5.41	
			Temperature (C)	24.99	26.33	25.49	26.72	
			Conductivity (uS/cm)	490	479	514	475	
			pH (SU)	7.1	7.19	7.09	7.23	
			Turbidity (NTU)	0.8	0	6.2	0	
			Dissolved Oxygen (mg/l)	0.9	1.69	32.4	5.03	
			Chloride (mg/l)	40	80	80	80	
			ORP (mV)	0.7	268.1	115.7	256.3	
			Iron II (mg/l)	<0.2	<2	0.2	<2	
LABORATORY ANALYSES	RL	Units						
Metals by SW-846 Method 6010B								
Arsenic	0.03	mg/L		**<0.03**	**<0.03**	**<0.03**	**<0.03**	0.05
Iron	0.2	mg/l		**0.0495 F**	**0.0287 F**	**0.0367 F**	**0.0298 F**	0.3
Date Analyzed				*22-Mar-01*	*7-Nov-01*	*22-Mar-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series								
Alkalinity	10	mg/L		**210**	**197**	**230**	**175**	NS
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

Concentration exceeds the FDEP Cleanup Target Goals

NA= not analyzed

NS= no standard

F = the analyte was positively identified but the associated numerical values is below the RL and above the MDL

Table 4
OU-21 Groundwater Analytical Results

			Sample ID	OU21-MW-0005		OU21-MW-0006			FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	Overpumping	PRAY1SA1	62-777
			Laboratory ID No.	L0103348-09	L0111005-01	L0103348-10	L0108340-05	L0111005-02	GCTLs
			Sample Date	13-Mar-01	30-Oct-01	13-Mar-01	14-Aug-01	30-Oct-01	
			Depth To Water At Sampling (ft, BTC)	3.62	3.88	5.57	5.50	5.76	
			Temperature (C)	25.21	25.56	24.94	25.72	25.88	
			Conductivity (uS/cm)	545	565	448	443	496	
			pH (SU)	7.13	7.18	7.19	7.31	7.04	
			Turbidity (NTU)	0.3	0	0.1	1.4	0	
			Dissolved Oxygen (mg/l)	1.7	1.62	1.7	6.22	3.93	
			Chloride (mg/l)	60	80	40	120	80	
			ORP (mV)	167.1	211.4	186.9	183.4	276.4	
			Iron II (mg/l)	<0.2	<2	<0.2	<0.2	<2	
LABORATORY ANALYSES	RL	Units							
Metals by SW-846 Method 6010B									
Arsenic	0.03	mg/L		**<0.03**	**0.00615 F**	**0.557**	**0.537**	**0.445**	**0.05**
Iron	0.2	mg/L		**0.0349 F**	**0.0324 F**	**0.0377 F**	**0.0206 F**	**0.0322 F**	**0.3**
Date Analyzed				*22-Mar-01*	*7-Nov-01*	*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series									
Alkalinity	10	mg/L		**190**	**184**	**210**	**210**	**206**	**NS**
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	

			Sample ID	OU21-MW-0007		OU21-MW-0008		FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	PRAY1SA1	62-777
			Laboratory ID No.	L0103348-11	L0111005-03	L0103348-12	L0111005-04	GCTLs
			Sample Date	13-Mar-01	30-Oct-01	13-Mar-01	30-Oct-01	
			Depth To Water At Sampling (ft, BTC)	5.5	5.27	3.48	3.09	
			Temperature (C)	26.01	27.73	25.15	26.14	
			Conductivity (uS/cm)	462	451	554	722	
			pH (SU)	7.3	7.31	6.94	6.76	
			Turbidity (NTU)	8.7	0	0.3	9.8	
			Dissolved Oxygen (mg/l)	2	3.61	0.5	0.55	
			Chloride (mg/l)	100	60	100	120	
			ORP (mV)	238.1	269.4	-107.9	-68	
			Iron II (mg/l)	0.4	<2	1.8	2.8	
LABORATORY ANALYSES	RL	Units						
Metals by SW-846 Method 6010B								
Arsenic	0.03	mg/L		**0.011 F**	**0.0136 F**	**0.0133 F**	**0.0185 F**	**0.05**
Iron	0.2	mg/L		**0.0417 F**	**0.0244 F**	**1.17**	**1.41**	**0.3**
Date Analyzed				*22-Mar-01*	*7-Nov-01*	*22-Mar-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series								
Alkalinity	10	mg/L		**170**	**177**	**220**	**278**	**NS**
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

Concentration exceeds the FDEP Cleanup Target Goals

NA= not analyzed

NS= no standard

F = the analyte was positively identified but the associated numerical values is below the RL and above the MDL

Table 5
OU 22
Groundwater Analytical Results

		Sample ID No.	OU22-MW12R	OU22-MW12R	FAC Chapter 62-777	FAC Chapter 62-777
		Laboratory ID No.	L8407	L0207258-03	GCTLs	NADSC
		Date Well Sampled	06-Jul-00	16-Jul-02		
		Depth To Water At Sampling (ft. BTC)	4.11	4.60		
LABORATORY ANALYSES	Units	PQL				
Volatile Organic Compounds (Method 8260B)						
acetone	µg/L	10	NA	<10	700	7000
benzene	µg/L	1	9	20.4	1	100
bromobenzene	µg/L	1	<1	<1	NS	NS
bromochloromethane	µg/L	0.5	<1	<0.5	91	910
bromodichloromethane	µg/L	1	<1	<1	0.6	60
bromoform	µg/L	1	<1	<1.2	4.4	440
bromomethane	µg/L	1	<1	<1.1	9.8	98
n-butylbenzene	µg/L	1	9	4.05	NS	NS
sec-butylbenzene	µg/L	1	3	4.27	NS	NS
tert-butyl benzene	µg/L	1	1	2.64	NS	NS
carbon tetrachloride	µg/L	1	<1	<2.1	3	300
chlorobenzene	µg/L	0.5	<1	<0.5	100	400
chloroethane	µg/L	1	<1	<1	12	1200
chloroform	µg/L	0.5	<1	<0.5	5.7	570
1-chlorohexane	µg/L	1	NA	<1	NS	NS
chloromethane	µg/L	1	<1	<1.3	2.7	270
2-chlorotoluene	µg/L	1	<1	<1	140	1400
4-chlorotoluene	µg/L	0.6	<1	<0.6	140	1400
1,2-dibromo-3-chloropropane	µg/L	1	<1	<2.6	0.2	20
chlorodibromomethane	µg/L	0.6	<1	<0.6	0	40
dibromomethane	µg/L	1	<1	<2.4	NS	NS
1,2-dichlorobenzene	µg/L	1	<1	<1	600	6000
1,3-dichlorobenzene	µg/L	1	<1	<1.2	10	100
1,4-dichlorobenzene	µg/L	1	<1	<1	75	7500
dichlorodifluoromethane	µg/L	1	<1	<1	1400	14000
1,1-dichloroethane	µg/L	0.5	<1	<0.5	70	700
1,2-dichloroethane	µg/L	0.7	<1	<0.7	3	300
1,1-dichloroethene	µg/L	1	<1	<1.2	7	700
cis 1,2 dichloroethene	µg/L	1	<1	<1.2	70	700
trans 1,2 dicloroethene	µg/L	0.6	<1	<0.6	100	1000
1,2-dichloropropane	µg/L	0.5	<1	<0.5	5	500
1,3 dichloropropane	µg/L	0.5	<1	<0.5	NS	NS
2,2-dichloropropane	µg/L	1	<1	<3.5	NS	NS
1,1 dichloropropene	µg/L	1	<1	<1	NS	NS
cis-1,3-dichloropropene	µg/L	1	<1	<1	0.2	20
trans-1,3-dichloropropene	µg/L	1	<1	<1	0.2	20
ethyl benzene	µg/L	1	61	11.1	30	300
1,2-dibromoethane	µg/L	1	NA	<0.6	0.02	20
hexachlorobutadiene	µg/L	1	<1	<1.1	0.5	50
isopropyl benzene	µg/L	0.5	7	16.3	0.8	8
p-isopropyltoluene	µg/L	1	1	<1.2	NS	NS
methylene chloride	µg/L	1	<1	<2	5	50
naphthalene	µg/L	1	27	26.8	20	200
n-propyl benzene	µg/L	1	28	37.2	NS	NS
styrene	µg/L	1	<1	<1	100	1000
1,1,1,2-tetrachloroethane	µg/L	0.5	<1	<0.5	1.3	130
1,1,2,2-tetrachloroethane	µg/L	0.8	<1	<0.8	0.2	20
tetrachloroethene	µg/L	1	<1	<1.4	3	300
toluene	µg/L	1	<1	0.371 F	40	400
1,2,3 trichlorobenzene	µg/L	1	<1	<1	70	700
1,2,4 trichlorobenzene	µg/L	1	<1	<2	70	700
1,1,1-trichloroethane	µg/L	0.8	<1	<0.8	200	2000
1,1,2-trichloroethane	µg/L	1	<1	<1	5	500
trichloroethene	µg/L	1	<1	<1	3	300
trichlorofluoromethane	µg/L	1	<1	<1	2100	21000
1,2,3 trichloropropane	µg/L	1	<1	<3.2	0.2	20
1,2,4-trimethylbenzene	µg/L	1	96	0.323 F	10	100
1,3,5-trimethylbenzene	µg/L	1	18	0.371 F	10	100
vinyl chloride	µg/L	1	<1	<1.1	1	100
o-xylene	µg/L	1	1	<1.1	10	100
m, p-xylene	µg/L	1	33	0.523 F	10	100
Dibromofluoromethane (surrogate)	% recovery	75-125	80	94.8		
1,2-Dichloroethane-d4 (surrogate)	% recovery	62-139	NA	93.4		
Toluene-D8 (surrogate)	% recovery	75-125	84	98.6		
Bromofluorobenzene (surrogate)	% recovery	75-125	80	104		
Date Analyzed			14-Jul-00	18-Jul-02		

µg/l = Micrograms per liter
mg/l = Milligrams per liter
BTC = Below Top of Casing
NS = No Standard
NA = Not Analyzed

Above GCTL
GCTLs = Groundwater Cleanup Target Levels - FAC 62-777
NADSC = Natural Attenuation Default Source Concentrations
F = detect between RL & MDL

Table 6
Operable Unit 26
Groundwater Analytical Results

Monitoring Well	Sample Date	PCE (µg/L)	TCE (µg/L)	Total DCE (µg/L)	VC (µg/L)
NADSC	NA	300	300	700	100
GCTL	NA	3	3	70	1
B745-MW01	01-May-98	ND	8.9	10.46	ND
	14-Jun-01	ND	3.5	5.58	ND
	02-Aug-01	ND	ND	ND	ND
	07-Nov-01	ND	ND	ND	ND
	05-Feb-02	ND	3.87	8	ND
	23-Apr-02	ND	3	4.8	ND
	16-Jul-02	ND	ND	ND	ND
	23-Oct-02	ND	2.2	4.26	ND
SM60-MW01	01-Jun-94	Data Unavail	1700	Data Unavail	Data Unavail
	01-Feb-96	3	1600	470	7
	01-Oct-97	3.2	980	416	2.4
	01-May-98	2.8	690	360	2.5
	30-Nov-99	1.5	870	567.2	1.2
	15-Feb-00	1.73	144	136.23	ND
	15-May-00	1	50	48	ND
	22-Aug-00	ND	6.16	3.11	ND
	30-Nov-00	1.93	650	643.68	4.05
	14-Feb-01	1.34 F	194	228.49	3.39
	08-May-01	1.48	33.9	41.11	ND
	30-Jul-01	1.94	42.8	52.16	ND
	06-Nov-01	2.42	124	105.5	ND
	05-Feb-02	1.53	796	602	3.37
	23-Apr-02	1.43	109	118	0.45
	16-Jul-02	1.62	22.4	14.2	ND
	22-Oct-02	ND	570	781	21
OU26-IMW1	20-Apr-98	8.4	ND	29.4	3.1
	01-May-98	ND	6.9	49	2.6
	14-Jun-01	ND	0.45F	18.16	ND
	01-Aug-01	ND	0.41 F	20.59	ND
	06-Nov-01	ND	4.7	1.99	ND
	04-Feb-02	ND	1.7	6.9	0.6
	23-Apr-02	ND	1.3	9.1	0.89
	17-Jul-02	ND	3.26	5.9	ND
	23-Oct-02	ND	1.3	11.3	0.59
OU26-MW1D	01-May-98	ND	2.9	ND	ND
	30-Nov-99	ND	0.8	ND	ND
	15-Feb-00	ND	1.26	ND	ND
	15-May-00	ND	1	ND	ND
	22-Aug-00	ND	1.2	ND	ND
	30-Nov-00	ND	ND	ND	ND
	14-Feb-01	ND	4.87	ND	ND
	08-May-01	ND	1.59	ND	ND
	30-Jul-01	ND	0.78 F	ND	ND
	07-Nov-01	ND	1.2	ND	ND

Table 6
Operable Unit 26
Groundwater Analytical Results

Monitoring Well	Sample Date	PCE (µg/L)	TCE (µg/L)	Total DCE (µg/L)	VC (µg/L)
NADSC	NA	300	300	700	100
GCTL	NA	3	3	70	1
	04-Feb-02	ND	0.72	ND	ND
	22-Apr-02	ND	2.5	ND	ND
	17-Jul-02	ND	0.85	ND	ND
	22-Oct-02	ND	2.7	ND	ND
OU26-MW02	30-Nov-99	ND	ND	ND	ND
	15-Feb-00	ND	ND	ND	ND
	15-May-00	ND	ND	ND	ND
	22-Aug-00	ND	ND	ND	ND
	30-Nov-00	ND	ND	ND	ND
	14-Feb-01	ND	ND	ND	ND
	08-May-01	ND	ND	ND	ND
	01-Aug-01	ND	ND	ND	ND
OU26-IMW2	20-Apr-98	ND	ND	ND	ND
	01-May-98	ND	0.11F	0.41F	ND
	01-Aug-01	ND	ND	ND	ND
OU26-MW03	01-May-98	0.16F	**8.9**	11.2	0.28F
	30-Nov-99	ND	**3.7**	2.7	ND
	15-Feb-00	ND	**3.64**	2.58	ND
	15-May-00	ND	**4**	4	ND
	22-Aug-00	ND	ND	ND	ND
	30-Nov-00	ND	2.56	1.66	ND
	14-Feb-01	ND	**3.15**	3.12	ND
	08-May-01	0.45 F	**5.47**	1.45	ND
	30-Jul-01	0.33 F	**3.67**	2	ND
	06-Nov-01	0.291	**3.55**	2.15	ND
	04-Feb-02	ND	2.54	2.1	ND
	23-Apr-02	ND	2.37	2.24	ND
	17-Jul-02	0.408	5.18	2.37	ND
	23-Oct-02	ND	**2.9**	1.69	ND
OU26-IMW3	20-Apr-98	1.4	**185**	370.6	5.1
	01-May-98	1.8F	**260**	423	2.5F
	30-Nov-99	0.4F	**31**	65.1	ND
	15-Feb-00	0.71 F	**79.5**	**125.4**	0.98 F
	15-May-00	ND	**97**	**154**	**1**
	22-Aug-00	2.38	**120**	**182.14**	**1.04**
	30-Nov-00	ND	**55**	**75**	ND
	14-Feb-01	0.92 F	**113**	**151.57**	**1.77**
	08-May-01	1.06 F	**119**	**159.8**	**1.18**
	30-Jul-01	0.76 F	**104 M**	**166.7**	**1.17**
	06-Nov-01	0.951	**123**	**202**	ND
	06-Feb-02	1.15	**125**	**185**	**2.17**
	23-Apr-02	1.3	**130**	**164**	**1.8**
	16-Jul-02	1.09	**163**	**195**	ND
	23-Oct-02	1	**150**	**202**	1.9

Table 6
Operable Unit 26
Groundwater Analytical Results

Monitoring Well	Sample Date	PCE (µg/L)	TCE (µg/L)	Total DCE (µg/L)	VC (µg/L)
NADSC	NA	300	300	700	100
GCTL	NA	3	3	70	1
OU26-MW04	01-May-98	1.1F	**20**	44	**2.4F**
	30-Nov-99	1.5	**43M**	63.4	ND
	15-Feb-00	**3.59**	**66.3 M**	**93.24**	ND
	15-May-00	ND	**16**	29	ND
	22-Aug-00	ND	**3.82**	3.34	ND
	30-Nov-00	1.61	**15**	28.64	ND
	14-Feb-01	1.81	**26.5 M**	49.39	0.56 F
	08-May-01	1.56 M	**21.7 M**	46.97	ND
	30-Jul-01	1.98	**4.57**	6.9	ND
	07-Nov-01	1.6	**15.1M**	23.4	ND
	06-Feb-02	2.23	**34.4**	61.6	0.54
	23-Apr-02	2.49	**29.6**	48.4	ND
	16-Jul-02	1.63	**6.2**	8.5	ND
	22-Oct-02	0.98	**7.9**	12.86	ND
OU26-MW05	01-May-98	ND	**0.55F**	0.16F	ND
	14-Jun-01	ND	**0.940 F**	1.91	ND
OU26-MW06	01-May-98	0.5	**5.8**	3.2	ND
	15-May-00	ND	**19**	11	ND
	22-Aug-00	1.71	**11**	20.65	ND
	30-Nov-00	ND	**22**	17.05	ND
	14-Feb-01	ND	**14.1**	11.48	ND
	08-May-01	ND	1.18	0.77	ND
	02-Aug-01	ND	**3.57**	2.95	ND
	06-Nov-01	ND	**2.63**	1.98	ND
	06-Feb-02	ND	**15.1**	16.3	ND
	23-Apr-02	ND	**17**	11	ND
	16-Jul-02	ND	**1.01**	0.86	ND
	23-Oct-02	ND	**16**	11.61	ND
OU26-MW08	01-May-98	ND	ND	ND	ND
	01-Aug-01	ND	ND	ND	ND
OU26-MW09	08-May-01	ND	**5.12**	1.78	ND
	02-Aug-01	ND	ND	ND	ND
	06-Nov-01	ND	ND	ND	ND
	06-Feb-02	ND	0.81	0.32	ND
	23-Apr-02	ND	2.10	0.83	ND
	16-Jul-02	ND	ND	ND	ND
	22-Oct-02	ND	ND	ND	ND

Bold above GCTLs.
"-" = Not applicable.
F = detected below RL
M = matrix interference
ND= not detected

Table 6
Operable Unit 26
Groundwater Analytical Results

Monitoring Well	Sample Date	PCE (µg/L)	TCE (µg/L)	Total DCE (µg/L)	VC (µg/L)
NADSC	NA	300	300	700	100
GCTL	NA	3	3	70	1

Table 7
OU-30 Groundwater Analytical Results

			Sample ID	SM10-MW-0001		AOC1-MW-0002			FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	BASELINE	PRAY1SA1	
			Laboratory ID No.	L0103348-21	L0111030-03	L0103348-22	L0107491-02	L0111031-02	62-777
			Sample Date	14-Mar-01	01-Nov-01	14-Mar-01	26-Jul-01	31-Oct-01	GCTLs
			Depth To Water At Sampling (ft, BTC)	2.1	1.84	4.62	3.78	4.00	
			Temperature (C)	23.98	25.81	24.86	26.56	26.86	
			Conductivity (uS/cm)	278	209	573	405	592	
			pH (SU)	7.28	7.53	7.01	7.16	6.94	
			Turbidity (NTU)	5.4	170	3.4	0.8	0	
			Dissolved Oxygen (mg/l)	1.5	0.32	0	3.38	0.72	
			Chloride (mg/l)	40	60	100	NA	40	
			ORP (mV)	-46.8	-100.5	236.8	140	210	
			Iron II (mg/l)	0.2	<2	<0.2	NA	<2	
LABORATORY ANALYSES	RL	Units							
Metals by SW-846 Method 6010B									
Aluminum	0.2	mg/L		NA	NA	<0.2	<0.2	NA	0.2
Arsenic	0.03	mg/L		0.0273 F	0.0248 F	0.24	0.302	0.264	0.05
Dissolved Arsenic	0.03	mg/L		NA	NA	0.224	0.297	NA	
Iron	0.2	mg/l		0.16 F	0.126 F	0.386 F	0.0278 F	0.0219 F	0.3
Dissolved Iron	0.2	mg/L		NA	NA	0.377 F	0.0462 F	NA	
Date Analyzed				*20-Mar-01*	*8-Nov-01*	*20-Mar-01*	*31-Jul-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series									
Alkalinity	10	mg/L		120	102	240	190	246 M	NS
Chloride	2	mg/L		NA	NA	26	23	NA	250000
TDS	10	mg/L		NA	NA	350	280	NA	NS
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*	*1-Aug-01*	*2-Nov-01*	

			Sample ID	AOC1-MW-0004		AOC1-MW-0005		FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	PRAY1SA1	
			Laboratory ID No.	L0103348-25	L0111031-07	L0103348-27	NA	62-777
			Sample Date	14-Mar-01	31-Oct-01	14-Mar-01	NA	GCTLs
			Depth To Water At Sampling (ft, BTC)	2.21	1.83	2.91	NA	
			Temperature (C)	24.39	26.08	23.74	NA	
			Conductivity (uS/cm)	514	419	365	NA	
			pH (SU)	7.1	7.25	7.29	NA	
			Turbidity (NTU)	1.1	0	1.1	NA	
			Dissolved Oxygen (mg/l)	0.5	0.84	0.1	NA	
			Chloride (mg/l)	80	80	60	NA	
			ORP (mV)	142.6	1.4	98.4	NA	
			Iron II (mg/l)	<0.2	<2	<0.2	NA	
LABORATORY ANALYSES	RL	Units						
Metals by SW-846 Method 6010B								
Aluminum	0.2	mg/L		NA	NA	NA	NA	0.2
Arsenic	0.03	mg/L		<0.03	<0.03	0.00986 F	NA	0.05
Dissolved Arsenic	0.03	mg/L		NA	NA	NA	NA	
Iron	0.2	mg/L		0.0327 F	0.0718 F	0.0225 F	NA	0.3
Dissolved Iron	0.2	mg/L		NA	NA	NA	NA	
Date Analyzed				*20-Mar-01*	*8-Nov-01*	*20-Mar-01*		
Wet-Chemistry by EPA 300 series								
Alkalinity	10	mg/L		190	162	160	NA	NS
Chloride	2	mg/L		NA	NA	NA	NA	250000
TDS	10	mg/L		NA	NA	NA	NA	NS
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*		

Concentration exceeds the FDEP Cleanup Target Goals

NA= not analyzed

NS= no standard

F = the analyte was positively identified but the associated numerical values s below the RL and above the MDL

Table 7
OU-30 Groundwater Analytical Results

			Sample ID	OU30-MW-0006			OU30-MW-0007		FAC Chapter
			Event	Y1SA1	BASELINE	PRAY1SA1	Y1SA1	PRAY1SA1	
			Laboratory ID No.	L0103348-29	L0107491-05	L0111031-06	L0103348-30	L0111031-08	62-777
			Sample Date	14-Mar-01	26-Jul-01	31-Oct-01	14-Mar-01	31-Oct-01	GCTLs
			Depth To Water At Sampling (ft, BTC)	4.4	4.02	3.96	3.62	3.38	
			Temperature (C)	25.31	26.78	26.69	24.23	25.93	
			Conductivity (uS/cm)	587	444	548	559	379	
			pH (SU)	7.02	7.03	7.10	6.98	7.22	
			Turbidity (NTU)	0.3	3	0	0.2	9.8	
			Dissolved Oxygen (mg/l)	0.4	2.86	1.6	0.5	0.46	
			Chloride (mg/l)	80	NA	80	60	60	
			ORP (mV)	238.2	147.1	251.9	62.8	9.8	
			Iron II (mg/l)	<2	NA	<2	<0.2	<2	
LABORATORY ANALYSES	RL	Units							
Metals by SW-846 Method 6010B									
Aluminum	0.2	mg/L		**<0.2**	**<0.2**	**NA**	**NA**	**NA**	**0.2**
Arsenic	0.03	mg/L		**0.213**	**0.214**	**0.278**	**<0.03**	**0.00664 F**	**0.05**
Dissolved Arsenic	0.03	mg/L		**0.185**	**0.227**	**NA**	**NA**	**NA**	
Iron	0.2	mg/L		**0.0221 F**	**0.034 F**	**0.12 F**	**0.051 F**	**0.0265 F**	**0.3**
Dissolved Iron	0.2	mg/L		**0.121 F**	**0.0463 F**	**NA**	**NA**	**NA**	
Date Analyzed				*20-Mar-01*	*1-Aug-01*	*8-Nov-01*	*20-Mar-01*	*8-Nov-01*	
Wet-Chemistry by EPA 300 series									
Alkalinity	10	mg/L		**240**	**200**	**199**	**230**	**167**	**NS**
Chloride	2	mg/L		**29**	**23**	**NA**	**NA**	**NA**	
TDS	10	mg/L		**340**	**280**	**NA**	**NA**	**NA**	
Date Analyzed				*19-Mar-01*	*1-Aug-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

			Sample ID	OU30-MW-0008		OU30-MW-0009		FAC Chapter
			Event	Y1SA1	PRAY1SA1	Y1SA1	PRAY1SA1	
			Laboratory ID No.	L0103348-31	L0111030-01	L0103348-32	L0111030-02	62-777
			Sample Date	14-Mar-01	01-Nov-01	14-Mar-01	01-Nov-01	GCTLs
			Depth To Water At Sampling (ft, BTC)	2.41	2.11	2.35	2.05	
			Temperature (C)	23.44	25.75	23.95	27.07	
			Conductivity (uS/cm)	588	323	513	549	
			pH (SU)	7.05	7.12	7.06	7.11	
			Turbidity (NTU)	0.5	0	1.2	0	
			Dissolved Oxygen (mg/l)	0.1	1.23	0	0.45	
			Chloride (mg/l)	80	100	40	60	
			ORP (mV)	180	202.5	241	161.8	
			Iron II (mg/l)	<0.2	<2	<0.2	<2	
LABORATORY ANALYSES	RL	Units						
Metals by SW-846 Method 6010B								
Aluminum	0.2	mg/l		**NA**	**NA**	**NA**	**NA**	**0.2**
Arsenic	0.03	mg/L		**<0.03**	**<0.03**	**0.0379**	**0.0288 F**	**0.05**
Dissolved Arsenic	0.03	mg/L		**NA**	**NA**	**NA**	**NA**	
Iron	0.2	mg/L		**0.0242 F**	**0.0211 F**	**0.174 F**	**0.0519 F**	**0.3**
Dissolved Iron	0.2	mg/L		**NA**	**NA**	**NA**	**NA**	
Date Analyzed				*20-Mar-01*	*8-Nov-01*	*20-Mar-01*	*8-Nov-01*	
Wet-Chemistry by EPA 300 series								
Alkalinity	10	mg/L		**210**	**207**	**220**	**200**	**NS**
Chloride	2	mg/L		**NA**	**NA**	**NA**	**NA**	
TDS	10	mg/L		**NA**	**NA**	**NA**	**NA**	
Date Analyzed				*19-Mar-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

Concentration exceeds the FDEP Cleanup Target Goals

NA= not analyzed

NS= no standard

F = the analyte was positively identified but the associated numerical values is below the RL and above the MDL

Table 8
OU-31 Groundwater Analytical Results

Sample ID			B755-MW-0001			OU31-MW-0002		FAC Chapter
Event			Y1SA1	Overpumping	PRAY1SA1	Y1SA1	PRAY1SA1	62-777
Laboratory ID No.			L0103348-15	L0108340-08	L0111005-07	L0103348-16	L0111005-08	GCTLs
Sample Date			13-Mar-01	14-Aug-01	30-Oct-01	13-Mar-01	30-Oct-01	
Depth To Water At Sampling (ft, BTC)			2.45	2.58	2.34	2.35	1.99	
Temperature (C)			23.66	26.48	26.01	23.04	25.59	
Conductivity (uS/cm)			274	261	280	427	393	
pH (SU)			7.34	7.52	7.45	6.95	7.14	
Turbidity (NTU)			12.8	2.6	0	1.1	0	
Dissolved Oxygen (mg/l)			4	0.17	0.27	4	0.22	
Chloride (mg/l)			40	60	60	40	40	
ORP (mV)			-118.3	74.7	-90.9	-56.3	-116.8	
Iron II (mg/l)			0.8	<0.2	0.8	<0.2	0.8	
LABORATORY ANALYSES	RL	Units						
Metals by SW-846 Method 6010B								
Arsenic	0.03	mg/L	**0.155**	**0.0529**	**0.0176 F**	**0.00646 F**	**0.0206 F**	**0.05**
Iron	0.2	mg/L	**0.326**	**1.35**	**0.308**	**0.149 F**	**0.504**	**0.3**
Date Analyzed			*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	*22-Mar-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series								
Alkalinity	10	mg/L	**130**	**110**	**120**	**210**	**216 M**	**NS**
Date Analyzed			*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	*19-Mar-01*	*2-Nov-01*	

Sample ID			OU31-MW-0003			FAC Chapter
Event			Y1SA1	Overpumping	PRAY1SA1	62-777
Laboratory ID No.			L0103348-19	L0108340-07	L0111031-01	GCTLs
Sample Date			13-Mar-01	14-Aug-01	31-Oct-01	
Depth To Water At Sampling (ft, BTC)			2.89	2.87	2.56	
Temperature (C)			23.35	26.15	26.12	
Conductivity (uS/cm)			377	370	350	
pH (SU)			7.15	7.21	7.24	
Turbidity (NTU)			0.5	0	0	
Dissolved Oxygen (mg/l)			2.7	0.18	0.28	
Chloride (mg/l)			60	40	40	
ORP (mV)			107.2	22.6	71.6	
Iron II (mg/l)			0.2	<0.2	<2	
LABORATORY ANALYSES	RL	Units				
Metals by SW-846 Method 6010B						
Arsenic	0.03	mg/L	**0.0582**	**0.0432**	**0.0133 F**	**0.05**
Iron	0.2	mg/L	**0.167 F**	**0.0853 F**	**0.0349 F**	**0.3**
Date Analyzed			*22-Mar-01*	*16-Aug-01*	*7-Nov-01*	
Wet-Chemistry by EPA 300 series						
Alkalinity	10	mg/L	**200**	**200**	**148**	**NS**
Date Analyzed			*19-Mar-01*	*20-Aug-01*	*2-Nov-01*	

Concentration exceeds the FDEP Cleanup Target Goals

F = the analyte was positively identified but the associated numerical values is below the RL and above the MDL

NA= not analyzed

NS= no standard

APPENDIX A

REFERENCES

REFERENCES

Engineering-Science, 1983. Installation Restoration Program Phase I Records Search, HAFB, Florida, 1983.

Geraghty & Miller, Inc., 1988. *Final Report, Remedial Action Plan*, Electroplating Waste Disposal Area (Former Site SP-1), Homestead Air Force Base, Florida, 1988.

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Geraghty & Miller, 1990. *NFA Decision Document for Site LF-19/WP-23*, Homestead Air Force Base, Florida. November 1990.

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IT Corporation, Operable Unit 22 Groundwater Sampling Report, August 2000

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IT Corp., Draft Final Interim Remedial Action Y1SA1 Groundwater Monitoring Report for OUs20/21, OU30 and OU31, Former Homestead Air Force Base, Miami-Dade County, Florida, dated April-02

IT Corp., Final Remedial Action Work Plan for OUs20/21, OU30 and OU31, Former Homestead Air Force Base, Miami-Dade County, Florida, dated May-00

Law Engineering and Environmental Services and OHM Remediation Services Corporation, Final Remedial Action Work Plan for Operable Unit 6/SS-3, Aircraft Washrack Area, Homestead Air Reserve Base, Florida, dated January 1996 and amended February 1997

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Montgomery Watson, Inc., 1996. *Final Extended Site Investigation Report/Preliminary Risk Evaluation, Operable Units 10 through 14*, Homestead Air Force Base, Florida. March 1996.

Montgomery Watson, Inc., 1998a. *Draft Final Remedial Investigation/Baseline Risk Assessment Report, OU-11, Sewage Treatment Plant Sludge/Incinerator Ash Disposal Area and Outfall Canal*. Volume I. September 1998.

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Montgomery Watson, Final Record of Decision, for OU18, OU26, OU28, and OU29, Oct-98.

Montgomery Watson, Final Site Investigation Report for Sites WP-23 and LF-19 Sewage Treatment Plant, Homestead Air Reserve Base, Oct-94

Montgomery Watson, Final Site Investigation Report for Sites SS-26, Drum Storage Area, Building 720, Homestead Air Reserve Base, Oct-94

Montgomery Watson, Draft Record of Decision, for OUs20/21, OU30, and OU31, June-98.

Montgomery Watson, Final Remedial Investigation/Baseline Risk Assessment Report for OUs20/21, OU30, and OU31, Dec-98

Montgomery Watson, Draft Feasability Study Report for OUs20/21, OU30, and OU31, Sept-98

OHM Remediation Services Corp., Oil/Water Separator Closure and Site Investigation Report 28 OWS Sites, Former Homestead Air Force Base, Mar-95

OHM Remediation Services Corp., Oil/Water Separator Closure and Site Investigation Report Eight OWS Sites, Nos. 164, 706, 711, 723, 750, 766, 779, and 7312, Former Homestead Air Force Base, May-95

OHM Remediation Services Corporation, Final Remedial Action Work Plan for OU26, OU28, OU29, and IRAs, Former Homestead Air Force Base, Dade County, Florida, dated May-99

Versar, Inc., Final Technical Report – Preliminary Assessment/Site Investigation Structure 793 (OU 17) Site, Jul-97

Versar, Inc., Final Technical Report – Preliminary Assessment/Site Investigation Structure 898 (OU 16) Site, Jul-97

Woodward-Clyde, 1995. Final OU-9 Remedial Investigation. Homestead Air Reserve Base, Florida. November 1995.

Woodward-Clyde, 1996. *Supplemental Investigation of the Outfall Canal*, HAFB, Florida. March 1996.

APPENDIX B

CLOSURE LETTERS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

SEP 2 5 RECD

September 24, 1997

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Thomas J. Bartol
Department of the Air Force
AFBCA/DD Homestead (3)
29050 Coral Sea Blvd., Box 36
Homestead ARB, FL 33039-1299

SUBJ: Extended Site Investigation/Preliminary Risk Evaluation (ESI/PRE) Report for Operable Units (OUs) 10-14; Homestead Air Force Base, Florida

Dear Mr. Bartol:

The Environmental Protection Agency (EPA) has reviewed the subject document transmitted by the December 17, 1996, memorandum from Humberto Rivero to Earl Bozeman and others. This document satisfactorily addresses Earl Bozeman's May 23, 1996, comments. Based on the information contained in this document, EPA agrees with the recommendation for No Further Remedial Action Planned (NFRAP) at this time for Operable Units (OUs) 10, 13, and 14. Operable Units 11 and 12 should continue through the CERCLA process. If I can be of further assistance, please call me at (404) 562-8549.

Sincerely,

Doyle T. Brittain

Doyle T. Brittain
Senior Remedial Project Manager

cc: Jorge Caspary, FDEP
Hugh Vick, Gannett-Fleming

METROPOLITAN DADE COUNTY, FLORIDA

METRODADE

HR 377-97

ENVIRONMENTAL RESOURCES MANAGEMENT
WASTE MANAGEMENT DIVISION
SUITE 800
33 S.W. 2nd AVENUE
MIAMI, FLORIDA 33130-1540
(305) 372-6817

March 11, 1997

Mr. Humberto Rivero
BRAC Environmental Coordinator
AFBCA/OL-Y
29050 Coral Sea Blvd.
Homestead, Florida 33039-1299

CERTIFIED MAIL NO. Z 164 998 607
RETURN RECEIPT REQUESTED

RE: Draft Final Preliminary Assessment/Site Investigation Report for OU-17 (Building 793/Hawk Missile Site) at the former Homestead Air Force Base, Homestead, Dade County, Florida.

Dear Mr. Rivero:

The Industrial Waste Section of the Department of Environmental Resources Management (IWS/DERM) has reviewed the referenced report, dated February 18, 1997.

In a letter dated June 4, 1996 (attached), DERM responded to the Draft Preliminary Assessment/Site Investigation Report for the referenced site. In said letter, DERM concurred with the report's conclusion that contamination at the referenced site only marginally exceeded DERM's action levels, and conditionally approved the No Further Action (NFA) proposal.

The conditions were that (a) soil contaminated with arsenic at 10 mg/kg be encapsulated; (b) risk to personnel be acknowledged since the concentration of arsenic exceeded 3.4 mg/kg, and (c) the United States Environmental Protection Agency and the Florida Department of Environmental Protection concur.

Since the letter of June 4, 1996, all parties have agreed that the action level of 10 mg/kg for arsenic in soil is applicable base-wide without conditions. Therefore, the NFA proposal is hereby approved for the referenced site.

This Department appreciates the opportunity to comment on this matter. Please contact me or James Carter at (305) 372-6804 If you wish to discuss this subject further.

Sincerely,

Robert E. Johns, P.E., Chief
Hazardous waste Section
POLLUTION PREVENTION DIVISION

Attachment
CC: Pedro Hernandez, P.E, DCAD
J. R. Caspary, P.G., FDEP-Tallahassee
Earl Bozeman, EPA-Atlanta

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

4WD-FFB

March 18, 1997

Mr. Thomas J. Bartol
BRAC Environmental Coordinator
Department of the Air Force
AFBCA/DD Homestead (3)
29050 Coral Sea Blvd., Box 36
Homestead ARB, FL 33039-1299

SUBJ: Draft Preliminary Assessment/Site Investigation
OU-16, Structure 898 Site, and OU-17, Structure 793 Site
Homestead AFB, Florida

Dear Mr. Bartol:

In consultation with the Florida Department of Environmental Protection, the U.S. Environmental Protection Agency (EPA) has reviewed Homestead Air Force Base's February 18, 1997, Draft Preliminary Assessment/Site Investigation OU-16, Structure 898 Site, and OU-17, Structure 793 Site, and determined that they are acceptable as written.

Thank you for your cooperation. If you have any questions, please call me at (404) 562-8549.

Sincerely,

Doyle T. Brittain

Doyle T. Brittain
Senior Remedial Project Manager

cc: Jorge Caspary, FDEP

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

April 9, 1997

Mr. Tom Bartol
AFBCA OL-Y
29050 Coral Sea Blvd.
HARB, Florida 33039-1299

RE: Draft Final PA/SI for OUs 16 and 17. Homestead ARB, Florida

Dear Mr. Bartol:

I have reviewed the above referenced documents dated January 1997 (received February 25, 1997) and deem the revised documents adequate; therefore, the Department approves them as "Final".

If I can be of any assistance in this matter, please contact me at 904/488-3935.

Sincerely,

Jorge R. Caspary, P.G.

cc: Doyle Brittain, EPA-Atlanta
Bob Johns, DERM-Miami
John Mitchell, AFRES-Homestead
Maj. Rolando Greenfield, AFCEE
Michael Andrejko, VERSAR-Miami

TJB JJC ESN ESN

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JORGE R. CASPARY LICENSE NO. 1331 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

OU-6

DEC 28 REC'D

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Kirby B. Green, III
Secretary

December 9, 1998

Mr. Tom Bartol
AFBCA OL/Y
29050 Coral Sea Blvd
Homestead ARS, FL 33039-1299

RE: Draft 2nd Semiannual Groundwater Monitoring Report for OU-6. Homestead ARS, Florida

Dear Mr. Bartol:

I have reviewed the above referenced document dated October 1998 (received November 5, 1998) and consider it adequate for its purposes. The proposal to grant this site a No Further Action is acceptable in view that Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene at 27, <10 and <10 ug/l, respectively do not exceed the departmental criteria for Total Naphthalenes (100 ug/L) applicable at the time the Remedial Action Workplan was approved in February 1996. In order to keep the Administraive Record intact, you may choose to develop a CERCLA Decision Document specifying the above concurrence.

If I can be of any assistance in this matter, please contact me at 850/488-3935.

Sincerely,

Jorge R. Caspary, P.G.

c: John B. Mitchell, HARS
James Carter, DERM
Doyle Brittain, EPA-Atlanta

TJB JJC ESN

MAR 17 1999

MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
POLLUTION CONTROL DIVISION
33 S.W. 2nd AVENUE
SUITE 800
MIAMI, FLORIDA 33130-1540
(305) 372-6817

March 15, 1999

Mr. Thomas J. Bartol
BRAC Environmental Coordinator, AFBCA/DD
29050 Coral Sea Boulevard, Building 736
Homestead ARS, Florida 33039-1299

RE: Final Year 2 Annual Groundwater Monitoring Report/No Further Action Proposal (QSR/NFAP) dated February 1999, and prepared by OHM Remediation Services Corporation for former HAFB Site OU-6 (HWR-0070/#13000), located at, near, or in the vicinity of Homestead Air Reserve Station, Homestead, Miami-Dade County, Florida.

Dear Mr. Bartol:

The Department of Environmental Resources Management (DERM) has reviewed the above referenced document received February 12, 1999.

Based upon the fact that the assessment and remedial activities at this site were approved prior to September 23, 1997 the former cleanup criteria for Total Naphthalenes (i.e. 100 ug/L) is the applicable GCTL; therefore, as the reported level is 27 ug/L, this site qualifies for "No Further Action."

If you have any questions regarding this letter, please contact Charles Hallas of the Pollution Remediation Section at (305) 372-6700.

Sincerely,

Wilbur Mayorga, P.E., Chief
Pollution Remediation Section

ch
pc: Robert Brown, P.G., OHM
Doyle Brittain, EPA
Jorge Caspary, FDEP
James Carter, DERM

OU 6

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 07 RECD

June 3, 1999

4WD-FFB

FAX

Thomas J. Bartol
Department of the Air Force
AFBCA/DD Homestead (3)
29050 Coral Sea Blvd., Box 36
Homestead ARS, FL 33039-1299

SUBJ: Draft Final Second Annual Groundwater Monitoring Report for OU-6
Homestead Air Force Base, Florida

Dear Mr. Bartol:

The Environmental Protection Agency (EPA) has reviewed the file on the subject site and is aware of our previous letters. We recognize that the language in the ROD regarding the five year review is open for at least two interpretations. We also note that the ROD calls for benzene concentrations to be "less than 1ug/l" while we note that the subject report says that the benzene concentration "is 1 ug/l" - not less than but is. We will not debate the issue further since this is hair-splitting and we both have more important issues to deal with. So, EPA agrees with the determination for no further action with unrestricted reuse. Please prepare the appropriate site closeout report and provide a copy to us. If I can be of further assistance, please call me at (404) 562-8549.

Sincerely,

Doyle T. Brittain
Senior Remedial Project Manager

cc: John B. Mitchell, HAFB/AFRES
Jorge Caspary, FDEP
James Carter, DERM
Hugh Vick, Gannett Fleming

OU 26, 28, 29

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

December 13, 2000

Mr. Tim Caretti
AFBCA Homestead
29050 Coral Sea Boulevard, Building 736
Homestead ARS, Florida 33039-1299

RE: Final ROD Implementation Report for OUs 26, 28, 29, and IRAs. Homestead AFB, Florida

Dear Mr. Caretti:

I have reviewed the above referenced document dated October 2000 (received October 26, 2000). Based upon previous BCT discussions, the proposal to address marginal PAH contamination in soil via deed transfer documents is adequate. In order to maintain a structured progress of the remaining sites at Homestead, I am addressing each one individually.

1. Operable Unit 11: No additional excavation work is warranted on the land portion of this OU. However, I recommend that the BCT delay any action at this OU until the issue of Outfall Canal is resolved.
2. Operable Unit 14, Excavation 1 and 2: No additional excavation work is warranted at the OU. The proposal to address exceedances of PAHs in soil via deed transfer documents is acceptable.
3. Operable Unit 16: No additional excavation work is warranted at the OU. The previously issued NFA (requested and concurred on April 9, 2000) is confirmed.
4. Operable Unit 22, Areas A, B, C, D, and E: No additional excavation work is warranted at the OU. The proposal to address exceedances of PAHs in soil via deed transfer documents is acceptable.
5. Operable Unit 26, Excavation 1, 2, and 3: No additional excavation work is warranted at the OU. The proposal to address exceedances of PAHs in soil via deed transfer documents is acceptable.
6. OU-29, Excavation 1, 2, 3, and 4: No additional excavation work is warranted at the OU. The proposal to address exceedances of PAHs in soil via deed transfer documents is acceptable.

7. OWS 779 and 792: No additional excavation work is warranted at both OWS sites. Note, the Department previously concurred on No Further Action for both sites.
8. OWS 795: No additional excavation work is warranted at the site. The proposal to address exceedances of PAHs in soil via deed transfer documents is acceptable.

If I can be of any assistance in this matter, please contact me at 850/488-3935.

Sincerely,

Jorge R. Caspary, P.G.

cc: Doyle Brittain, EPA-Atlanta
Curt Williams, DERM-Miami
Vik Kamath, FDEP Southeast District
John B. Mitchell, AFRES Homestead

TJB TB JJC JJC ESN ESN

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178-2

FLORIDA

Florida Department of Environmental Protection

OFFICIAL CORRESPONDENCE - **This electronic message is sent in lieu of regular mail**

To: Tim Caretti

Facility: Homestead Air Force Base

Date: March 21, 2002

From: Jorge R. Caspary, P.G.

Site or Document: Final OU-28 ROD Implementation Report.

Document Date: October 2000

Receipt Date of Document: October 2002

Based on Ms. Lee Conesa's request, I am confirming receipt of the above report. As stated in previous correspondence, the Department expectes soil and groundwater access restrictions at OU-28. However, based on the recent results for OU-21 soil resampling, perhaps resampling the areas at OU-28 is warranted since it is possible that since the excavation, natural soil processes might have contributed to degrading the contaminants found in OU-28.

If you have any questions, please contact me at (850) 921-9986.

Jorge R. Caspary, P.G.

APPENDIX C

SITE INSPECTION CHECKLIST

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Homestead Air Force Base	Date of inspection: January 2002-October 2002
Location and Region: Florida, Region IV	EPA ID: FL7570024037
Agency, office, or company leading the five-year review: U.S. Air Force Real Property Agency	Weather/temperature: varied

Remedy Includes: (Check all that apply)

x Landfill cover/containment (OU-18) x Monitored natural attenuation (OU-26)
x Access controls (OU-18) Groundwater containment
x Institutional controls (OUs 20/21, 28, 29, 30, 31) Vertical barrier walls
Groundwater pump and treatment
Surface water collection and treatment
x Other Groundwater Monitoring (OU 18, 20/21, 22, 30, 31)

II. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   x O&M manual x Readily available Up to date N/A
   As-built drawings Readily available Up to date X N/A
   x Maintenance logs X Readily available Up to date N/A
   Remarks

2. **Site-Specific Health and Safety Plan** x Readily available Up to date N/A
   x Contingency plan/emergency response plan x Readily available X Up to date
   Remarks

3. **O&M and OSHA Training Records** X N/A
   Remarks

4. **Permits and Service Agreements**
   N/A

5. **Gas Generation Records** x N/A
   Remarks

6. **Settlement Monument Records** x N/A
   Remarks

7. **Groundwater Monitoring Records** x Readily available Up to date N/A
   Remarks

8. **Leachate Extraction Records** X N/A
   Remarks

9.	**Discharge Compliance Records**			
	G Air	Readily available	Up to date	X N/A
	G Water (effluent)	Readily available	Up to date	X N/A
	Remarks_____			
10.	**Daily Access/Security Logs**	Readily available	Up to date	X N/A
	Remarks_____			

III. ACCESS AND INSTITUTIONAL CONTROLS	X Applicable	N/A

A. Fencing OU-18

1.	**Fencing damaged**	Location shown on site map	Gates secured	X N/A
	Remarks_____			

B. Other Access Restrictions

1.	**Signs and other security measures**	Location shown on site map	X N/A
	Remarks_____		

C. Institutiona l Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented Yes x No N/A
Site conditions imply ICs not being fully enforced Yes x No N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Drive by
Frequency Monthly
Responsible party/agency Air Force Real Property Agency
Contact Humberto Rivero (Name) Site Manager (Title) 305-224-7013 (Phone no.)

Reporting is up-to-date Yes No x N/A
Reports are verified by the lead agency Yes No x N/A

Specific requirements in deed or decision documents have been met Yes No x N/A
Violations have been reported Yes No x N/A
Other problems or suggestions: N/A

2. **Adequacy** x ICs are adequate ICs are inadequate N/A
Remarks_____

D. General

1. **Vandalism/trespassing** Location shown on site map x No vandalism evident
Remarks_____

2. **Land use changes on site** x N/A
Remarks_____

3. **Land use changes off site** x N/A
Remarks_____

IV. GENERAL SITE CONDITIONS

A. Roads G Applicable x N/A

1. **Roads damaged** Location shown on site map Roads adequate x N/A
Remarks_____

B. Other Site Conditions

Remarks N/A

V. LANDFILL COVERS X Applicable OU 18 N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map X Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map X Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** Location shown on site map X Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** G Location shown on site map X Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** Grass X Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** X N/A
   Remarks_____

7. **Bulges** Location shown on site map X Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** X Wet areas/water damage not evident
   Remarks_____

9. **Slope Instability** Slides Location shown on site map X No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches Applicable x N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels Applicable x N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations x Applicable N/A

1. **Gas Vents** N/A

Remarks_____

2. **Gas Monitoring Probes** N/A

Remarks_____

3. **Monitoring Wells** (within surface area of landfill)

x Properly secured/locked x Functioning x Routinely sampled x Good condition

Evidence of leakage at penetration Needs Maintenance N/A

Remarks_____

4. **Leachate Extraction Wells** N/A

Remarks_____

5. **Settlement Monuments** N/A

Remarks_____

E. Gas Collection and Treatment Applicable x N/A

F. Cover Drainage Layer Applicable x N/A

G. Detention/Sedimentation Ponds Applicable x N/A

H. Retaining Wa lls Applicable x N/A

I. Perimeter Ditches/Off-Site Discharge Applicable x N/A

VI. VERTICAL BARRIER WALLS Applicable x N/A

VII. GROUNDWATER/SURFACE WATER REMEDIES XApplicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines	Applicable	XN/A
B. Surface Water Collection Structures, Pumps, and Pipelines	Applicable	XN/A
C. Treatment System	Applicable	x N/A

D. Monitoring Data

1. Monitoring Data
   x Is routinely submitted on time x Is of acceptable quality
2. Monitoring data suggests:
   x Groundwater plume is effectively contained x Contaminant concentrations are declining

E. Monitored Natural At tenuation

1. **Monitoring Wells** (natural attenuation remedy)
   x Properly secured/locked x Functioning x Routinely sampled x Good condition
   x All required wells located Needs Maintenance N/A
   Remarks: Several monitoring wells were found at OUs 6 and 10 (these sites are closed) and were properly abandoned.

VIII. OTHER REMEDIES

N/A

IX. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

All of the remedies at the OUs are operating appropriately and successfully

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The O&M operations at this site are inherent to the long-term protectiveness of the remedies implemented.

C. Early Indicators of Potential Remedy Problems N/A

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

As concentrations are reduced, monitoring wells, constituents and frequencies can be decreased.